# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

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## Contents

| | PAGE |
|---|---|
| EDITORIAL NOTES: Colonial Chemical Trade; United Chemical Manufacturers; Mr. Tizard's Departure | 67 |
| Marriage of Mr. J. A. Benn | 69 |
| How to Succeed in Colonial Markets | 70 |
| Notes on Some Colonial and Foreign Markets | 72 |
| The Position of the Russian Chemical Industry | 75 |
| Association of British Chemical Manufacturers: Annual Meeting | 76 |
| The Relation of Organic Chemistry to Biology: Professor Barger's Presidential Address to the Chemistry Section of the British Association | 80 |
| Chemical Engineering Examinations: Papers Set by the Institute | 82 |
| Chemical Notes from Westminster | 86 |
| From Week to Week | 87 |
| References to Current Literature | 88 |
| Patent Literature | 89 |
| Weekly Chemical Prices and Market Reports | 92 |
| Company News; Chemical Trade Inquiries | 98 |
| Commercial Intelligence; New Companies Registered | 100 |

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## Colonial Chemical Trade

ATTENTION is directed in this issue both to the opportunities that our Colonies represent as markets for British chemicals and other products and to the conditions necessary for securing and keeping such colonial trade. It is obvious that many of our Colonies are still comparatively in their infancy. Canada, Australia, New Zealand and South Africa, to mention only four, have room for enormous expansions of population and almost endless scope for the employment of British capital. The growth of population and capital involves a corresponding growth of industry, in which chemicals and chemical engineering must play an indispensable part. The importance, therefore, of our Colonies from the standpoint of export trade must not be measured by their present powers of consumption. It is even more important to keep in mind their future and to ensure an adequate part in it.

Already, British chemicals and chemical plant are very largely used in our Colonies in connection with agriculture (a field presenting great scope for synthetic nitrogenous fertilisers), mining (which requires large quantities of explosives), drugs, colours, and the wide diversity of occupations included in the term "chemical industry." The tendency in the future will probably be more and more to erect local plants in the larger colonies (as Imperial Chemical Industries, Ltd., are now doing), so as to avoid the cost of transport and to be in closer touch with local conditions. If this, on the one hand, should restrict the actual exports from this country, it will, on the other, provide larger openings for chemists, chemical engineers, and chemical plant of every description. Such outposts, too, will always have their centre in this country.

In the matter published in this issue, reference is again made to the importance of a thorough study of local conditions and characteristics in catering for colonial trade. Salesmanship involves the imagination to see exactly the buyer's point of view, and the more this is appreciated the better is the chance of securing orders. British methods have repeatedly been criticised as being too inelastic, and rather lacking in vision of what colonial conditions demand. Probably this has been exaggerated in the desire to discover faults and remedy them; at the same time, it is well to attend to such suggestions, for neglect of some detail may easily mean the diversion of trade to some more attentive rival. The tendency of the larger organisations is now to undertake their own salesmanship and merchanting, but the number able to do this well is still comparatively small, and for a long time to come the merchant will continue to be an important factor in the continuance of overseas trade.

## United Chemical Manufacturers

No one present at the annual dinner of the Association of Chemical Manufacturers last week could be in any doubt as to the unity of the chemical manufacturing interest in this country or as to the continued vigour of the valuable organisation that comprehends and represents it. As Dr. Levinstein pointed out, at the time when the association was formed, there were—so the pleasantry goes—no two chemical manufacturers who really knew each other or, if they did, did not thoroughly dislike and distrust each other. That, of course, is a picturesque exaggeration, but it suggests what is undoubtedly true, that the chemical manufacturers of this country before the association was formed had no feeling for collective organisation on behalf of their common interests and, in fact, rather viewed the idea with suspicion. It is due to the A.B.C.M. that that isolation has disappeared and the industry has an influential body that can speak authoritatively for all its constituent firms, big and small. This means that British chemical industry has not only a definite policy, but also an instrument for implementing it.

The speeches on these occasions are informal and not intended for public consumption. It is only permissible, therefore, to refer in general terms to one or two points of interest. No one could have proposed the toast of "H.M. Ministers" in nicer terms than the Chairman (Dr. G. C. Clayton) and no one could have

more delicately suggested the need of a small disclosure of their intentions towards certain matters in which the industry is directly concerned. The suggestion was repeated in equally tactful and ingratiating terms by Sir D. Milne-Watson and Sir Arthur Duckham. To all these seductive approaches, we have rarely heard a more diplomatic reply than that of Mr. W. R. Smith, M.P., who represented the Board of Trade in the absence of the President. He was entirely friendly, sympathetic, appreciative; he assured the Association of the pleasure with which any representations from them would be received and the deep regard that would be paid to them. But his speech disclosed not the faintest hint of what the Government contemplate doing or not doing. It was a masterpiece of discretion that must have satisfied even the most exacting authority on departmental rectitude.

None the less, there was force in Sir Arthur Duckham's point that the industry has a right to know from the Government where it stands. There can be no doubt at all that he had in mind certain safeguarding duties that apply to chemicals and probably also the future of the Dyestuffs (Import Regulation) Act. Sir Arthur did not say what the Government should or should not do in these matters; what he did suggest quite clearly and reasonably was that the industry should know what the Government's intentions are and should not be left in anxious uncertainty. When it knows definitely what the conditions are to be for the next twelve months or two years, the industry, whether helped or hindered by new regulations, can make its arrangements accordingly, but continued doubt as to what may happen at any moment simply holds up business. Some instances of this have already been reported to us. In one case, where the placing of substantial orders for chemical plant was on the point of being completed, the negotiations were arrested pending an official announcement of Government policy. "Let's wait and see what happens before committing ourselves"—that seems to be the common attitude of mind. It is an attitude that kills initiative and enterprise.

So far as one could judge, the chemical manufacturers are solidly behind Sir Arthur Duckham in his desire for a clear statement of Government policy. On another matter, his view might be slightly open to challenge—that is, on the difficulty that industrialists experience in finding first-class research men. Researchers of a sort are plentiful enough—good, honest, industrious laboratory drudges; but when the demand is for an absolutely first-class man, the response, it is said, is disappointing. In chemical, no more than in other industries is the super-type common. In any case, a man of this type would reasonably require a position with responsibility and possibilities of advancement corresponding to his qualifications, and he would also be entitled to corresponding pay. An impression prevails that industry has not been in the past too eager to recognise and remunerate research at its proper value, and that would naturally make first-class men a little shy in committing themselves. If, however, it becomes known that industry really wants men of the highest class and is prepared to pay for them, the supply will certainly in the end be forthcoming.

## Mr. Tizard's Departure

THE announcement that Mr. H. T. Tizard, Secretary of the Department of Scientific and Industrial Research, is vacating that post to succeed Sir Thomas Holland as Rector of the Imperial College of Science at South Kensington, has been received with considerable interest, not unmixed with a little surprise. By the staff of the Department, Mr. Tizard's departure will be regarded with genuine regret. To a large extent, he may be said to have grown up with the Department. He has now been associated with it for nine years, during which period he has been largely responsible for the details of its scientific organisation and has gained a very full insight into the relation of scientific research to industry. Being essentially a man of science himself, he has been able all through this experience to appreciate the scientific worker's point of view, and this to a large extent accounts for the happy relations between himself and the staff. It may be said, indeed, that to the staff he has been friend and colleague as well as chief, and his resignation will sever very happy personal, as well as professional, ties based on long acquaintanceship and growing mutual respect.

It is a position of high responsibility and distinction that Mr. Tizard is vacating. It may be regarded as the senior official research appointment at the disposal of H.M. Government, and the Department, still comparatively young, appears to have an increasingly important future before it. The Rectorship of the Imperial College, however, has one attraction that would probably appeal strongly to Mr. Tizard. That is the opportunity it affords of personal contact with large numbers of young men of science, and of training them for important and responsible posts in industry. His experience at the Department in the application of science to industry and the increasing dependence of the one on the other, as well as his personal gifts as a teacher, admirably qualify him for such a task, and the success that he may reasonably hope to attain in this field will be some compensation for the sense of loss with which his departure is at present viewed. To the qualifications of a scientist in the strict sense of the term, he adds the qualities now commonly associated with the term "chemical engineering"; the qualities, that is, of turning scientific knowledge to practical account in the industrial field.

Mr. Tizard, who was born in 1885, was educated at Magdalen College, Oxford, and became a fellow of Oriel, where he lectured on Natural Science and took a special interest in thermodynamics. Students still speak of the clearness of his expositions of scientific principles. On the outbreak of the war he joined H.M. forces in 1914, serving with the Royal Garrison Artillery for a year and then transferring to the R.F.C., with which he was associated for some years. In 1918 he attained the rank of Lieutenant-Colonel and became Assistant Controller of Experiments and Research to the Air Ministry. In this capacity his work is spoken of in the highest terms. Mr. Tizard joined the D.S.I.R. in 1920. He served as assistant secretary until 1922 and as principal assistant secretary from 1922 to 1927, when he was appointed Secretary on the retirement of Sir Frank Heath. He was elected a Fellow of the Royal Society in 1926 and received the distinction of C.B. in 1927.

# Marriage of Mr. John Andrews Benn

[*Topical Press.*

A PHOTOGRAPH OF MR. JOHN A. BENN (ELDEST SON OF SIR ERNEST BENN) AND MISS URSULA ALERS HANKEY (ONLY DAUGHTER OF SIR MAURICE HANKEY) LEAVING ST. MARGARET'S, WESTMINSTER, AFTER THEIR MARRIAGE ON TUESDAY. MR. BENN, WHO STUDIED CHEMISTRY AT CAMBRIDGE, AND WAS FOR A TIME A MEMBER OF THE SOCIETY OF CHEMICAL INDUSTRY, IS A DIRECTOR OF BENN BROTHERS, PROPRIETORS OF "THE CHEMICAL AGE." HE BEGAN HIS JOURNALISTIC WORK ON THIS JOURNAL, AND FOR SOME TIME PAST HAS BEEN EDITOR OF "DISCOVERY," A SCIENCE MONTHLY.

# How to Succeed in Colonial Markets

## Merchanting—Direct and Joint Selling—Advertisement

*Experienced as this country is in the science of export trade, there is always something new to be learned on the subject. The views expressed below summarise the conclusions on the subject of "Factors in Competitive Efficiency" contained in the final report of the Balfour Committee on Trade and Industry, and are worth the attention of all who cater for trade with our Colonies or with foreign nations.*

ATTENTION has been directed to two main forms of marketing organisation. On the one hand, goods may be sold through merchants or middlemen in Great Britain, either for overseas or for the home market, or they may be sold or consigned to merchant houses in overseas countries. On the other hand, they may be sold through a manufacturer's own marketing organisation, either at home or abroad, or through a joint marketing organisation. The main antithesis is between the practice of selling through an intermediary and of selling direct. Both these systems prevail very widely in British overseas trade, and though there is some evidence that direct selling is on the whole gaining ground, there is still a great field within which the merchant system remains predominant.

### The Functions of the Merchant

Critics of the merchanting system state that export trade is often lost to British manufacturers through the fact that it passes through the hands of a merchant to whom it is immaterial whether he sells British goods or foreign. The system arose before international competition developed, and in days when British goods predominated; but under modern conditions there is bound to be a tendency for the merchant to buy those goods which are the cheapest, irrespective of their origin. Sometimes, it has been suggested, the merchant house attains such size and importance that it is in a position to exercise a large measure of control over the market. Other critics have suggested that merchants established in a given market sometimes show a tendency to resent and oppose the intrusion of newcomers; and if merchants wish to keep a market to themselves the system may easily develop into a smoke screen between the market and the manufacturer, which prevents him from becoming acquainted with its actual requirements. There is also a tendency, it is said, for the merchant to become the sole agent of a particular manufacturer, with the consequence that manufacturers who are not allied with a merchant house have either to establish their own branches in the market, or to co-operate with other manufacturers in establishing joint selling organisations.

On the other hand, it is pointed out that the export trade of this country was, to a very great extent, built up by merchants, and a very large part of it is still conducted by them. There are very few trades in which the merchant does not play some part. The general merchant very frequently trades both ways and with many countries, and he renders a service to the consumer who, otherwise, could not know to which manufacturer to apply to fulfil his particular requirements. It is claimed with justice that the merchant system provides an intelligence organisation of a very widespread and efficient kind, and is on the whole effective in keeping the manufacturer in touch with the desires of consumers. The merchant in the traditional sense, who is experienced in the whole technique of buying and shipping, who possesses warehouses in the overseas markets in which stocks are carried, and who has built up a wide and valuable connection and a rich store of experience and knowledge of the market, supplies to the manufacturer a selling organisation which it would be impossible for him, at least for a long time, to build up for himself. There are some markets in which it is probably undesirable for the manufacturer to do trade direct, and in a new country with a limited market the services of a merchant are essential.

We are emphatically of opinion that a manufacturer who employs a merchant or other intermediary to market his goods abroad is not thereby dispensed from the duty of visiting the markets himself, and becoming personally acquainted with his representatives, as well as with market conditions. If those who are manufacturing for the export markets have continuous information as to the rapid changes that are always taking place, the merchanting system is much less likely to obscure their view of the needs and wishes of the consumer. It is also desirable that a manufacturer should give the merchant expert technical advice and assistance regarding the selling of his goods.

The complaint is very frequently made that there are too many non-producers between the manufacturer and the consumer. Others state that while the export merchant is indispensable and well worth the increment of price due to his particular remuneration, there are a great many intermediate commission takers, and people who, it is claimed, do no serious work and take no real financial risk, and who are in effect parasitic.

Attention has been called to a number of instances in which the difference between wholesale and retail prices was apparently excessive, but it is impossible to judge whether these are typical, or due to exceptional causes. We are, however, of opinion that there is no effective method of checking such abuses so long as many manufacturers cease to take any interest in their products as soon as they are disposed of to a wholesaler. Manufacturers should keep in direct touch with the conditions in their overseas markets, even though they may rely on merchants to distribute their products. A similar attitude to the home market (which for some industries is the most important outlet for their products) is at least equally necessary, with a view to discovering and so far as possible removing any obstacles which block the flow of trade from the manufacturer to the consumer.

### Direct Selling

The alternative to merchanting is that of selling direct to the consumer through a manufacturer's own marketing organisation or through a joint marketing organisation. The evidence points to a certain growth in what is known as direct trading in recent years. A large part of the trade is done direct in certain branches of the metal and engineering industries, and in electrical manufacture and cables. There is also a good deal of direct selling in the chemical industry and in the hosiery and carpet trades, and a certain amount in the motor cycle industry, and in the boot and shoe trade.

On a general review of the evidence, it is clear that the systems of merchanting and direct selling are bound to continue side by side, and in a great variety of forms, in British overseas trade, since each method possesses special advantages which make it best suited to the particular circumstances of certain branches of trade. Consequently neither system is likely to displace the other, though, as already stated, a movement is preceptible towards more direct selling. The merchant will continue to dominate the overseas marketing of the products of miscellaneous industries manufacturing a large variety of goods to be exported in comparatively small consignments. His services will also probably be found necessary in respect of

export to countries where it is essential to do trade both ways. But in the case of an industry producing a single commodity, and particularly a specialised commodity which requires expert knowledge in order to sell it, the most advantageous course for a firm which deals with a large volume of trade is usually to have its own organisation. Between these extreme examples lie a great range of cases in which the relative merits of direct and indirect trading are less clear, and in which they need to be carefully weighed against each other by each manufacturer in the light of the general considerations set out above.

### Joint Selling Organisations

Where the prospects of doing a large trade are not bright enough to justify the building up of a costly selling organisation, or where individual firms cannot afford to do it by themselves, the question arises whether several firms might not come together and form a joint organisation. We do not refer here to joint publicity campaigns conducted by groups of firms or by industries as a whole, or to forms of combined selling which arise from the financial association, for wider purposes, of two or more firms, but rather the combined employment of travellers, or the setting up in a given market of a permanent office and staff to whose upkeep several firms contribute, or arrangements whereby the output of several firms is disposed of in the overseas markets through the organisation of a firm specially constituted for the purpose.

Considerable differences of opinion exist on the merits of the question, and experience on the whole has not been favourable. A good many attempts have been made in the past to persuade manufacturers to undertake some form of joint representation in various overseas markets, but it has very often been difficult to arouse interest in such schemes ; and, although a number of experiments have been made, they have usually failed, largely on account of trade jealousy and lack of confidence among the parties to the arrangement. Thus, broadly speaking, it may be said that, although attention has been given in several industries to the question of joint representation, and although examples of joint selling organisations exist, it is not a form of marketing organisation which has been successfully used to any extent by British manufacturers.

### Overseas Agents and Commercial Travellers

A good deal of export trade is done through agents in overseas markets, who either sell on commission, or receive commission in addition to a salary, or in some instances buy on their own account. The evidence leaves the impression that a certain amount of trade is lost to this country each year through insufficient care on the part of British manufacturers in the selection of their agents abroad, and through defective supervision of the agents when appointed, and want of support and attention to their requests and representations. It should not be necessary to dwell on the importance of finding the right agent ; nevertheless, it appears from the evidence that British manufacturers sometimes neglect so obvious a precaution, and occasionally do not even ascertain whether the agent is genuinely prepared to forward their affairs, or whether he is merely seeking their agency in order to eliminate competition with other and more profitable business. Sometimes, too, they entrust their affairs to an agent who is handling so many agencies that the prospects of receiving due attention are slight. There should be no difficulty in obtaining information about prospective agents, either from the Chambers of Commerce and the banks interested in various geographical areas, or from the Federation of British Industries. Moreover, the Department of Overseas Trade has an extensive organisation for supplying British firms with trustworthy information as to agents likely to be suitable, and for obtaining information regarding any prospective agent that an exporter may have in mind.

There is also evidence that the British manufacturer frequently fails to realise the importance of supporting his agent, when appointed. Sufficient attention is not always paid to his representations, and inadequate allowance is sometimes made for expenses in connection with travelling, advertising, and so forth, and for the outlay entailed by the introduction of a new article to the market. We have also been informed that rates of commission often compare unfavourably with those given by foreign manufacturers. All these are obviously matters of business detail, on which no uniform rule is possible, but which require adjustment in accordance with the conditions of the market, the position and personality of the agent, and the nature of the business to be undertaken. What is important is that the competitive power of British trade in overseas markets should not be impaired by remediable defects in the arrangements for representation in those markets.

On the subject of commercial travellers in overseas markets, the evidence seems to indicate a somewhat wide diversity of conditions in different trades. Witnesses from some of the trades (*e.g.*, cotton and wool), which are most highly organised for purposes of export, spoke in the highest terms of the training and linguistic capacity of their travellers. From other witnesses came a good many criticisms of the lack of knowledge possessed by commercial travellers of the articles which they are endeavouring to sell, and of the languages of the countries which they visit. Other witnesses declared that German and American travellers are more alert and pushing, and that British travellers take too narrow a view of their duties, and do not keep their eyes open with a view to giving intelligent suggestions to their principals regarding the general furthering of their business. We feel sure that in cases where this last criticism is justified the fault lies usually, at least in part, with the home firm. Unless a traveller is encouraged to offer suggestions, and stimulated to continue to do so by the knowledge that his previous suggestions were really considered, it is certain that this valuable source of information as to changing conditions in local markets will rapidly dry up. British firms have something to learn from their foreign competitors as to their intimacy of relations not only with their agents abroad, but also with their commercial travellers.

Even where a firm possesses a permanent organisation in an overseas market, it may often still be desirable to send commercial travellers to that market, at not too infrequent intervals, for the purpose of keeping in touch both with the market and with the individual customers, and also of backing up the permanent organisation, with which any travelling representatives should of course keep in close touch. We repeat again, however, that no arrangements of this kind should be considered to dispense the heads of the home firm from paying personal visits to the overseas markets with which they trade.

### Advertisement and Display

The whole question of the net value and precise function of different forms of advertisement as a factor in successful overseas marketing is one which has received a great and increasing amount of attention in the commercial world in recent years, without, however, giving rise to any generally agreed doctrine on the subject.

There are some forms of advertisement, *e.g.*, attractive methods of packing and " get up," which have a great and incontestible selling value. Moreover, catalogues attractively and accurately prepared, so as to be suited in language and units of weight, measurement, and currency, to the markets to which they are sent, are obviously useful means of propaganda and marketing. In these matters British traders have in the past been subjected to much criticism by overseas firms and observers, who have compared their methods to their disadvantage with those of

many of their foreign competitors. On the whole, the general weight of evidence tends to show that British firms have learnt much in recent years, both from the continual warnings they have received, and from their own observation of the practice of their rivals, and that, while in some trades there is still leeway to make up, the "get up" of many classes of British goods exported overseas now compares not unfavourably with that of the foreign goods with which they compete. Moreover, a great improvement is said to be discernible in the form and contents of British trade catalogues.

**General Efficiency of Organisation**

We are impressed by some passages in the latest report by H.M. Senior Trade Commissioner in India, in which he emphasises the importance in modern conditions of new and scientific methods of marketing. Speaking from many years' experience in India and China, he says in effect that many British manufacturers fail to obtain their due share of the trade of the East owing to the fact that their marketing methods are faulty. The Department of Overseas Trade state that criticisms of this kind are not infrequently received, and that they do not apply to the Eastern markets alone. Many complaints from various parts of the world have come to our own notice. It is, of course, true that instances of inefficiency are apt to attract more notice than they deserve, and naturally we are not in a position to pass judgment on specific cases. But it is impossible, on a study of the evidence as a whole, not to receive the impression that, although a number of British exporting firms in all industries are as well represented in the consuming markets as any exporters in the world, too many British exporters show a want of proper activity in the way of intelligent and sympathetic study of the markets, and energetic salesmanship.

We regard it, therefore, as the duty of every British exporter to review his own arrangements and to make sure that they are beyond criticism. Such a review should cover not only the sales organisation but also the arrangements in the works and commercial office in this country; for however energetic and efficient a sales organisation may be, its efforts will be largely wasted if not properly supported from home. In this connection we may make reference to the importance of technical skill in producing tenders and the necessity of supplying goods fully up to the quality represented by the sales organisation. We may further instance such apparently obvious points as the desirability of prompt and courteous attention to direct inquiries, or the fact that orders are not likely to be repeated if trouble is caused by errors committed through inattention, or if goods are so badly packed that they arrive damaged. Finally, a matter to which too much importance cannot be attached is the keeping of promises in regard to delivery dates, for slackness in this direction can only lead to loss of trade.

It is quite certain that, unless the characteristics of the market are scientifically studied, with the satisfaction of the individual consumer as the governing factor in the whole of the manufacturer's organisation, British trade cannot hope to hold its own, still less to advance, when pitted against the capacity for systematic approach to their objective which is displayed by some of our foreign competitors.

# Some Colonial and Foreign Markets

## Canadian Chemical Industries

ACCORDING to a report forwarded by the Dominion Bureau of Statistics at Ottawa to the High Commissioner of Canada in London, Canadian chemical plants producing acids, alkalis, salts and compressed gases reported an output during 1928 valued at $42,336,846, a total nearly $12,000,000 in excess of the corresponding figure for 1927. Statistics for this group in 1928 covered the operations of 41 establishments of which 16 made heavy chemicals and 25 manufactured industrial gases.

(*a*) *Acids, Alkalis and Salts.*—Production in the acids, alkalis and salts group in 1928 was valued at $39,190,962, of which $21,256,286 represented the value of sales and $17,934,676 the value of intermediates made and used in further processes by the producing plants. Sixteen plants were in operation, including nine in Ontario, three in Quebec, three in British Columbia, and one in Nova Scotia. Capital employed amounted to $40,024,624, employees numbered 2,517, salaries and wages totalled $3,490,409, and materials cost $22,925,404.

Excepting sulphuric acid, each of the commodities made in this industry was produced by only one or two plants. Sulphuric acid was made in six plants, nitric acid in two, hydrochloric acid in two, calcium carbide for sale in two and for intermediate use in one, while each of the following commodities was made by only one concern; acetylene black, glacial acetic acid, hydrofluosilicic acid, phosphoric acid, butyl acetate, ethyl acetate, ammonium phosphate, calcium cyanamide, bleaching powder, liquid chlorine, iron phosphide, paraldehyde, phosphorus, soda ash, sodium cyanide, caustic soda, glauber's salt, salt cake and croton aldehyde. Production figures for these chemicals cannot be published separately.

(*b*) *Compressed Gases.*—Output value for the compressed gases industry totalled $3,145,884 in 1928. Capital employed was given at $4,226,037; employees numbered 426; salaries and wages amounted to $652,893; and materials cost $479,587.

Of the 25 plants in operation, 11 were in Ontario, six in Quebec, three in Manitoba, two in Nova Scotia, two in British Columbia, and one in Alberta. Acetylene was made in 11 different plants; carbon dioxide in seven; oxygen in 12, hydrogen in three, and aqua and anhydrous ammonia in one plant.

The output from the coal tar products industry in Canada in 1928 reached a new high level of $4,405,907, which is 16 per cent. in excess of the total for 1927.

Most of the increased production was in respect of pitch and road tars, which are extensively used in the building of the newer types of highways. Statistics for this group cover the operations of 19 plants, of which 10 were engaged in the distillation of coal tar and nine manufactured disinfectants.

The total capitalisation of the industry last year was $4,924,681; employees numbered 261; salaries and wages paid, $387,663; cost of materials, $2,734,823; selling value of products, $4,405,907; and the value added by manufacturing, $1,671,084.

The output of the industry in 1928 included the following products:—

| Products. | Unit of measure. | Quantity. | Selling value at works. $ |
|---|---|---|---|
| Coal Tar Distillation— | | | |
| Creosote and other oils .. | Imp. gal. | 7,552,768 | 1,416,956 |
| Pitch ..... | lb. | 108,095,427 | 585,027 |
| Refined tar, road tar, tarvia, tarco, etc. ..... | Imp. gal. | 9,453,666 | 1,208,635 |
| Protective paints, varnishes, etc. ..... | Imp. gal. | 263,100 | 147,087 |
| All other products (*) .... | — | — | 833,118 |
| Total ..... | | — | $4,190,823 |
| Disinfectants— | | | |
| Disinfectants ..... | — | (†) — | 101,605 |
| Insecticides ..... | — | (†) — | 30,735 |
| Liquid soaps ..... | — | (†) — | 44,810 |
| All other products ..... | — | — | 37,934 |
| Total ..... | | — | 215,084 |
| Grand Total .... | — | — | $4,405,907 |

(*) Includes tarred felts and sheathings and other products.

(†) Production figures for these items do not represent the total for Canada as there was also a production by firms in other industries.

## British Trade with Malaya

### Are Our Methods Less Efficient?

Discussing the reasons for the decline of United Kingdom trade with British Malaya, Mr. L. B. Beale, H.M. Trade Commissioner, mentions that in distribution the United Kingdom at present seems to be served with less efficiency and aggressiveness than her competitors. This has been brought about partly by the negligence of British manufacturers themselves and partly by the fact that some of the old British merchant firms in Malaya have gradually found estate management, export of produce, shipping and insurance agency work and so on easier than the highly competitive import trade, which has now become of secondary importance to some of them. If the United Kingdom had been more alive to the opportunities and sought the trade more aggressively and intelligently and, in particular, if we had cultivated a keener sales intimacy with the dominant factor in trade in British Malaya —the Chinese—our position to-day would be far better. An outstanding feature of the import merchant trade of British Malaya is the number, efficiency and aggressiveness of foreign firms, many of them established since the war. They and their principals (of Continental Europe) are establishing a very intimate contact with the local markets' requirements.

### Channels of Distribution

The main channels through which imports are dealt with and distributed are :—

1. Merchant firms both British and of Continental Europe. The number of the latter has considerably increased since the war. During recent years two or three firms specialising in American goods have also established themselves in British Malaya. Non-British merchant firms now outnumber the purely British firms, but all deal in both British and foreign goods. The British merchants only deal in British goods when it pays them to do so and the same is true of the Continental merchant firms. There is very little value in sentiment in this market.

2. A few large department stores who import direct (and not as a rule through local merchant firms) and maintain buying agents or offices in London and elsewhere.

3. Chinese merchants who increasingly import direct on their own account, to some extent, from the United Kingdom, but particularly from the Continent and Japan.

4. Other Asiatic merchants, mostly Indians, who deal mainly in goods from Japan, China and India, and in perfume and fancy goods from Europe.

5. Manufacturers' agents who secure indent orders from European and Asiatic traders.

### Methods of Distribution

Methods of distribution show signs of changing somewhat. The monopoly of distribution once enjoyed by European merchant firms no longer entirely obtains. True, most of such firms remain strong and useful, though many are performing services additional to the distribution of imports, and one cannot ignore the trend to more direct methods of trading. It is suggested that representatives of British manufacturers resident in Malaya, paid by salary plus commission on results, and attached to sound and aggressive existing merchant firms (who would hold distributing rights) or working independently, would bring about very satisfactory results, provided the right men were appointed. The United Kingdom needs more intelligent, hard-working specialist representatives who are willing and able to investigate requirements, combing every channel of trade and keeping their principals fully informed.

British Malaya is the centre of a number of valuable markets—Dutch East Indies, Siam and French Indo-China—and the right representative with headquarters at, say, Singapore, could work with the British manufacturers' merchant agents in all the markets named. This method has already been adopted with most satisfactory results to the British manufacturer in some cases which have come to the writer's notice. Two typical cases might be quoted.

1. A few years ago a well-known United Kingdom firm conducted all their business through a well-established Singapore merchant firm. Although the total trade of the area increased (with increasing competition from foreign suppliers) this method of conducting their business brought little or no increase to the British firm. They then established a resident representative, who thoroughly combed the markets of British Malaya, Siam and the Netherlands East Indies, with the result that to-day they are doing a very satisfactory volume of trade both to European and Asiatic importers, far larger than would have been the case under the former method.

2. A United Kingdom manufacturer of motor vehicles had enjoyed a modest volume of trade for some few years up to 1926 through a local distributor. Last year a resident representative from the factory—an experienced engineer—was appointed to reside in Singapore to look after their trade of Middle Asia, with the result that their business has trebled in the past twelve months despite the keenest competition from the United States of America.

Certain British manufacturers maintain travelling representatives who, once or twice a year, cover India, the Middle and the Far East. The results, where goods are more or less standardised and do not require constant sales contact, appear to be quite good. Such travelling representatives as were met with by the writer were well informed and hard working and obviously specialists in the trade of the East. But the United Kingdom needs more resident representatives specialising in investigation and distribution.

## British Goods for South African Markets

### Price and Suitability

In a recent report on economic conditions in South Africa, attention was drawn to the fall in the percentage of imports of United Kingdom origin from 56·4 per cent. in 1922 to 44·8 per cent. in 1927. It is no doubt due to a combination of factors, many of which are beyond the control of British manufacturers and exporters, and it has been, in fact, attributed to several different causes. One that is frequently quoted is the development of local industries and the consequent smaller import of manufactured goods and larger import of raw materials. This may be a contributory cause, but that it is not the main reason is clear from the fact that the decline in the British share of trade is visible not only in the total but in practically all the classes into which imports are separated in the trade returns and in the great majority of individual headings, including some such as cotton piece-goods, in which there is at present no local production. Another reputed cause is the withdrawal of the general preferential rebate of customs duty on imports of United Kingdom origin by the Customs Act of 1925. This also is no doubt a contributory cause, but that it also cannot be the main cause is shown by the fact that the decline is serious in several lines on which the rebate was actually increased in 1925. A third reputed cause is the greatly increased proportion of direct Government imports that have been obtained from countries other than the United Kingdom. This also has no doubt been a small contributory factor since, prior to 1925, a very high proportion of Government orders were placed with British firms and there has since been a heavy reduction. But the total volume of Government imports is too small for this change to have had so large an effect, and if commercial exports only are examined it will be found that the proportion obtained from the United Kingdom has fallen consistently from 54·22 per cent. in 1922 to 44·82 per cent. in 1927, the latter figure being nearly the same as the proportion of Government imports drawn from the same source in that year—namely, 44·30 per cent.

### Price Condition Essential

It is obvious then that the main cause has still to be found, and there can be no doubt that it is price. The South African market is essentially one in which cost is the main consideration, quality and other factors being in a large proportion of the trade of less consequence than they are in some other markets. During the past five years British prices generally have been high in relation to those quoted by competing nations, but since the facts are well known and the causes have been widely discussed, and since there is a good prospect of conditions improving, there is little to be gained by further discussion.

There is, however, another most important factor to which attention must be called. Complaint is constantly heard from all sections of the community that British manufactured goods of certain descriptions are unobtainable or difficult to procure suitable for South African requirements. A Trade Commissioner no doubt hears so much of the difficulties encountered by traders and consumers who desire to buy from the country that he represents, and so little of the efficient service rendered,

which is apt to be taken for granted, that it is difficult to form a true estimate of the adequacy of the sales service rendered. Many British firms have very complete and highly efficient selling organisations in South Africa, and there has been a notable increase during the past five years in the number of visits paid to the country by directors and export managers of firms interested in its trade. In spite of this, however, the number of complaints received indicates that there is still room for improvement, and that trade is still being lost which could be retained by more efficient service. Much could be done by skilful propaganda on behalf of British trade and by educating the buyer in the economy of paying for higher quality and durability, but what is wanted above all is closer study of the tastes, habits and needs of the market and better salesmanship, better service and better advertising.

## Trading with the Argentine

### A Great Field for British Enterprise

THE economic importance of the Argentine to the United Kingdom is now widely realised, but although a general knowledge of Argentine resources and prospects is still a sufficient guide for the investment of British capital, which has always formed the foundation of the predominant British position in the country's development, yet, on the other hand, the pronounced changes of recent years in the nature and distribution of Argentine commerce call for a much closer study than formerly of the local aspects and conditions of mutual trade.

The immediate and pressing aspect of this relationship is an increase in British exports to the Republic. The time has passed when industrial advantages alone could be counted on to cause British trade to expand. The concentration of United States and continental European competition on this, one of the few large open markets left, with the concurrent development of local industries, has largely transferred the market place of the Argentine import trade from the centres of production to Buenos Aires, thereby restricting opportunities for securing an increased share to those manufacturers and merchants, of whatever nationality, who through their branches, travelling representatives or competent local agents, and by the utilisation of local advertising and propaganda, seek it on the spot in Buenos Aires. Existing conditions of competition in the Argentine market makes this a foregone conclusion. The penetration of American goods, which is the most obvious change in Argentine post-war commerce, was brought about by American representatives and salesmen taking them to the Argentine.

### An Interesting Comparison

The number of overseas markets with which leading British export manufacturers can become and remain personally familiar has to be limited in practice to countries which have the largest import trade and offer the best prospects for an increase in the British share. Of these, outside the British Empire, the Argentine market is, under present conditions, one of the most prominent examples. As a buyer of British goods the Argentine Republic, with its relatively low population of 10,000,000, is only passed by the United States and Germany. We are not favoured in the Argentine, as in Australia, with a population of British origin and language, familiar with British goods, nor with a preferential tariff, but on the other hand we have in the Argentine considerable advantages over competitors, derived from the investment of many hundreds of millions of pounds of British capital; we have the goodwill of the Argentines towards British goods to such an extent as to constitute a preference for a British article at a competitive price; and we have an unrivalled machinery of distribution in shipping, banking, experienced local British merchants and agents, and British owned departmental stores. British manufacturers and merchants interested in selling in the Argentine market will therefore realise that the problem and responsibility are theirs alone of converting that goodwill and available machinery into actual business.

As to the British position in supplying the needs of this market, it has to be recorded that the coal dispute of 1926 caused a serious setback to British export trade to the Argentine, not only from the stoppage of coal shipments (which accounted for over £2,000,000 of the £6,000,000 of exports lost during the year) but also from the loss of Argentine orders owing to delays and uncertainty of delivery and increased cost of production in certain branches of industry. Coal contracts could not be entirely regained before the second quarter of 1927, and in other branches of trade the events of 1926 still left British trade at a disadvantage during the following year, in the face of the continued severity of foreign competition. Nevertheless, determined efforts are being made by many British manufacturers to regain business with the Argentine. If these efforts are not relaxed and are supplemented by visits for the purpose of acquiring a greater familiarity with the requirements of the market and the nature of foreign competition, British trade to the Argentine can be increased. The price factor is still the dominant feature of competition and therefore the chief difficulty confronting British agents. Cheapness accounts for the mass demand and conforms with the Argentine racial characteristic of living for the present because the immediate future may hold different fortunes and even a different environment, but it does not preclude a concurrent demand for something new or better, if offered and exhibited on the spot.

There is one other aspect of trading with the Argentine to which special attention must be drawn, and it emphasises even more strongly the necessity of constant study of local conditions as the way to increase trade, which is the main purpose of this discussion. The Argentine Republic, in common with the rest of South America, has had the reputation in the United Kingdom of being a market with which trade has to be conducted very largely on a credit basis accompanied by a certain degree of risk. It is so still, and the risk of loss seems to have increased with the intensity of competition. Importing firms, the number of whom has risen considerably, are cosmopolitan, with the Argentines themselves in the minority, and nothing can take the place of experience and vigilance in the assessment of individual credit risks.

## Chemical Activities in India

### Cutch in Burma

THE Burma Chamber of Commerce addressed the Local Government some time ago, pointing to the decline in the volume and value of the export trade in Burma cutch, both to foreign countries and India, and strongly recommended the reduction of the export royalty and the cost of obtaining trees for boiling. The Chamber also suggested that the Government should help the industry by teaching the boilers the techique of their trade and by inducing them to adopt some uniform method. In reply to the Chamber's letter, the Government stated that it did not see what action on its part would really improve matters. Cutch extraction and export were both subject to violent fluctuations, and technique could hardly be taught to workers whose interest in the trade was spasmodic and dependent on the state of the market.

### Ephedrine

During recent years, ephedrine, an alkaloid present in several species of *Ephedra*, has been increasingly used in medicine, and the demand has increased. Formerly, China used to supply the greater part of this drug, but owing to the disturbed conditions prevailing in that country, interest is now being taken in its supply from India. Samples of *Ephedra intermedia* sent from Kashmir, when examined at the Dehra Dun Forest Institute, were found to contain less than 0·1 per cent. of ephedrine. Thus it appears that *Ephedra intermedia* contains very little ephedrine, and is not of much commercial value. On the other hand, a sample of *Ephedra Gerardiana* (*vulgaris*), which is said to have been collected in India, was found to contain as much as 0·46 per cent. of ephedrine. Work is being carried out in this connection, and samples of *Ephedra* are being collected from various parts of India.

### Wood Preservatives

In the chemistry section at the Dehra Dun Forest Research Institute a number of analyses of creosote, etc., were undertaken with a view to determining their composition. A sample of wood preservative called " Atlastane " was found to consist of wood tar with a preponderation of low-boiling fractions. Another wood preservative called " Tectal " was found to be rich in high boiling fractions, and contained as much as 23·3 per cent. of tar acids together with saturated hydrocarbons. It is also interesting to note that a piece of wood taken from a rejected powellised *chir* sleeper, which had been in service for 16 years, was found on analysis to retain 0·046 per cent. (calculated on the wood) of arsenic oxide.

# The Position of the Russian Chemical Industry

## An Interesting Official Review

*The "Review" published monthly by the Bank for Russian Trade contains in the current number the following account of the progress and development of chemical industry in the U.S.S.R.*

THE chemical industry of the Soviet Union has made rapid progress during the past five years. The heavy chemical industry—which includes crude chemicals, wood distillation, coal tar, aniline dyes, paints and varnishes—has expanded during the past years at a particularly rapid rate. This can be seen from the following table showing gross production in thousand roubles at wholesale prices :—

PRODUCTION IN THOUSAND ROUBLES.

| Branch. | 1924–25 | 1925–26 | 1926–27 | 1927–28 | Per cent. of 1924–25 |
|---|---|---|---|---|---|
| Crude Chemicals..... | 42,814 | 57,345 | 68,945 | 81,559 | 190·5 |
| Paints and Varnishes .... | 25,435 | 39,858 | 36,272 | 44,788 | 176·0 |
| Aniline Dye Industry .... | 11,914 | 24,744 | 28,270 | 34,649 | 290·8 |
| Wood Distillation ..... | 2,364 | 3,956 | 6,030 | 8,529 | 360·7 |
| Coal Tar Industry ..... | 8,600 | 11,451 | 14,382 | 16,882 | 196·3 |
| Total..... | 91,127 | 137,354 | 153,899 | 186,407 | 204·5 |

The general position of the Russian chemical industry before the war was even lower than the average level for the whole of industry. Such important branches as the manufacture of synthetic dyes, medical and laboratory supplies, photographic chemicals, and mineral fertilisers were practically non-existent. Most of the chemical factories were technically backward and their output fell far short of satisfying the needs of the country, making it necessary to import considerable quantities from abroad—principally from Germany.

### Effects of War and Revolution

During the war imports from Germany were entirely cut off, while those from the allied countries were greatly restricted. This state of affairs resulted in considerable development in the work of the existing factories and the establishment of a number of new ones to satisfy the demand for goods which used to be imported before the war. The years of civil war wrought heavy damage to the chemical industry. Moreover, a large number of the leading engineers were foreigners, and most of them left the country during that period. This made the task of reconstructing the chemical industry even more difficult. In spite of all these obstacles, however, the industry has not only recovered from the depression of the civil war period, but has even surpassed the pre-war level.

The development of the coke by-product industry in the Donetz and Kuznetsk Basins has laid the basis for the building of an independent aniline dye industry. In 1927–28 coke production totalled about four million tons, which represents an increase over the preceding year of 15 per cent. The production of organic dyes has increased from 7,541 tons in 1926–27 to more than 10,000 tons in 1927–28, and at the present time the requirements of the textile industry are being satisfied to a large extent from the home production, whereas before the war the Russian textile industry was entirely dependent on German dyes.

The production has also been organised of a number of other chemicals never before manufactured in Russia. These include red phosphorus for the match industry, potassium fluoride used for the impregnation of railway sleepers, formic acid for the textile industry, carbon bisulphide for the rubber industry, hyposulphites, alums, barium chloride, sodium fluosilicate, magnesium sulphate and a number of other products.

### Drugs and Pharmaceutical Products

Many pharmaceutical preparations have been added to the list of products the manufacture of which has been started in the Soviet Union during the last few years. These include iodic salts, salicylic acid and salicylates, aspirin, codein, morphine, heroin, methyl ether, mercury compounds, bromides, adrenalin, iodoform, atrophine, tannin, pepsin, cocaine and a number of others. Research is being carried out with various other drugs with a view to organising their manufacture on a commercial basis.

Although the manufacture of chemicals and drugs not produced in Russia before the war represents an important development, the Soviet Government is attaching more importance to the expansion of mass production of the basic chemical products required by industry and agriculture. In spite of its development during recent years, the chemical industry is still unable to satisfy the steadily growing demand, and in the current financial year will be able to satisfy the requirements only to the extent of 72 per cent.

The wood distillation industry, which is based on the enormous timber resources of the Soviet Union, is now also being considerably developed, and plans have been adopted to extend the production of acetic acid, acetone and similar products, while the manufacture of turpentine, colophony and similar products has already been started.

The extensive timber resources and the large quantities of wood used as fuel offer a very favourable basis for further expansion of the industry. The five-year plans elaborated for this industry provide for the erection of thirteen new factories, to be concentrated chiefly in the Urals. Acetic acid will be the principal article to be produced by them.

### Fertilisers

The production of fertilisers is now more than three times as great as before the war, yet only part of the demand can be satisfied. The total output of fertilisers in the current year is estimated at 378,000 tons as compared with 209,000 tons in 1927–28 and 135,000 tons in 1926–27. The output in the current year will consist of 260,000 tons of superphosphates, 60,000 tons of ground phosphorite, 31,700 tons of ground bone, 7,100 tons of nitrates and 19,200 tons of ammonium sulphate. The discovery of the large potash deposit at Solikamsk in the Urals has opened up wide possibilities for this industry and exploitation of the deposit has already been started. The production of nitrates will be greatly extended after the completion of the Dnepr Hydro-Electric Station, in the vicinity of which a number of nitrate works are to be built in order to utilise the cheap power from it. A number of other chemical factories are planned in the same district.

Large investments have been made in the chemical industry during the past five years for the construction of new factories, re-equipment and capital repairs to the existing works. The following table shows investments and the estimates for the current financial year in roubles :—

| Year. | Roubles. |
|---|---|
| 1923–24 ..... | 5,220,000 |
| 1924–25 ..... | 14,700,000 |
| 1925–26 ..... | 48,310,000 |
| 1926–27 ..... | 60,100,000 |
| 1927–28 ..... | 73,100,000 |
| 1928–29 (Estimates) ..... | 146,800,000 |
| Total ..... | 348,230,000 |

In October, 1927, the All-Union Chemical Syndicate was formed with the object of stabilising the chemical market, unifying the commercial machinery of the chemical trusts, extending the selling agencies and popularising the use of chemical goods, particularly of fertilisers, in the Soviet Union. The trade turnover of the Syndicate amounted in 1927–28, which was the first year of its existence, to 113.9 million roubles, and the estimates for the current 1928–29 financial year are 230 million roubles. The paid-up capital of the Syndicate is 10 million roubles.

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### "Organic Syntheses"

DR. HENRY GILMAN, Department of Chemistry, Iowa State College, U.S.A., writes :—

"The Board of Editors of *Organic Syntheses* (an annual publication of satisfactory methods for the preparation of organic chemicals) has decided to collect, revise and rearrange the preparations described in the first nine volumes in such a way as to make them more suitable for general use in synthetic organic chemistry. All of these preparations are to be published in a single comprehensive volume to be designated as the "Collective Volume—Revision of Volumes I–IX." In this work of revision we would greatly appreciate suggestions in the way of corrections, difficulties in checking, new and improved methods, etc."

# Association of British Chemical Manufacturers

## Review of the Year's Work and Problems

*The work of the Association of British Chemical Manufacturers was fully reviewed by the Chairman and other speakers at the annual meeting last week. It will be seen that the subjects discussed included chemical exhibitions, the collection of more complete trade statistics, the new Model Safety Rules, Patent Law reform, and the attitude of the present Government towards safeguarding duties.*

THE thirteenth annual general meeting of the Association of British Chemical Manufacturers was held at the Chemical Society's Rooms, Burlington House, on Thursday, July 18.

### Chairman's Review of the Year

The Chairman (Dr. G. C. Clayton), in moving the adoption of the report, said in the course of his speech :—

The past year has been notable for several new lines of activity which should prove of value to members, while the volume of work has increased considerably. The membership shows a slight falling off in numbers due to unavoidable causes, but this gives no reason for anxiety. It is advisable, however, to secure as members all British chemical firms of importance, because the more completely representative the Association is of the industry, the greater will be its power to make representations to the Government and the more extensive can be its activities.

The Association has to mourn the loss of Sir John Brunner and Mr. W. H. Dawson, who have long served it faithfully and well and who, in their respective spheres, have played a very important part in the development of our chemical industry. Further staff changes have occurred, but we hope that we are now commencing a period which will be free from such disturbing influences. We are glad to have to record the appointment of our general manager to the secretaryship of the three associations mentioned in the report and to the Chemical Warfare Committee of the War Office. His appointment as chairman of the chemical sub-committee of that body will form a useful link between the chemical industry and the fighting services. I think we should like to congratulate our general manager. (Applause).

To turn now to the Directory, you will see that the 1929 issue, which is in many respects an improvement on its predecessors, has received a much wider distribution than previous issues. The Directory is, as you know, in six languages, namely, English, French, German, Italian, Spanish and Portuguese, and is, therefore, an admirable publication for world-wide distribution, a point which has been appreciatively recognised by the Press as an excellent example for other organisations to follow when attempting to further British trade. We have already distributed about 1,700 copies, which is more than five times the number issued in 1927. The new edition of *Some British Fine Chemicals*, which is in essence a fine chemical directory, will be widely distributed in the same way.

### British Industries Fair

Special mention must be made of the British Industries Fair and of the successful organisation of the Chemical Section. The arctic conditions which prevailed at the White City were enough to chill the ardour of anyone, and a move to some other site was practically forced on the Department of Overseas Trade. We should have liked to have seen a properly designed building erected on a suitable site, so that the British Industries Fair might come up to the same high standard of accommodation as Continental fairs, such as Leipzig and Lyons, but such a scheme had to be abandoned for financial reasons. The Department of Overseas Trade have now taken Olympia for the next ten years, and while the accommodation will be somewhat restricted at the start, the site will be more congenial and satisfactory than the White City in many ways. The general manager has made a study of the chemical sections in the main Continental fairs, and it is gratifying to find that our Chemical Section is far ahead of any other as regards the number, variety and technical interest of its exhibits. The Council's venture in arranging for special visits of chemistry teachers and students has met with a most enthusiastic response, and a large number of letters of appreciation were received from the Universities and Colleges which took advantage of the offer.

The subject of legislation has not caused us much trouble during the past year, but we can hardly hope for a continuation of this happy state of affairs, and we must be prepared to deal with such matters as they arise. Tariff questions are always a fruitful source of controversy, and it cannot be said that the past year has provided much relief from tariffs from the point of view of British trade. It was hoped that the recommendations of the Economic Conference of 1927 would have led to an all-round reduction of tariffs, but this hope has not been realised. In fact, there have been definite increases in certain tariffs since that time, and the most that can be said is that the Economic Conference has had a useful braking influence on the upward trend of tariffs. This is a problem which must be closely watched in future.

The Association has again prepared a memorandum on the British Chemical Industry for the League of Nations, and has received copies of the corresponding memoranda from Germany, Italy, Poland and Upper Silesia. Belgium and France were also asked by the League, but did not reply. All these documents contain valuable information, but unfortunately, the basis on which they are prepared and the form in which the information is set forth varies so widely for different countries, that it is hard, if not impossible, to draw accurate comparisons from the data provided. The League of Nations is however, endeavouring to secure some measure of uniformity to overcome these difficulties.

### The Collection of Statistics

I am glad to be able to comment more favourably than my predecessor last year on that hardy annual "statistics." Considerable progress has been made on schemes for the collection of production data in various branches of the industry, and I would like in particular to comment on the progress made in regard to the fine chemical industry. This branch of the industry is enjoying the protection afforded by the Safeguarding of Industries Act which normally has seven more years to run, but the position may be reviewed by the Government at any time. The Association must, therefore, be prepared at short notice to present a case to justify the safeguarding protection and to prove that the fine chemical manufacturers have taken full advantage of the safeguarding to develop the industry and to bring it to a high state of efficiency. To make such a case really convincing, it is essential that it should contain accurate statistical information to show the progress which is being made year by year. The importance of this question cannot be too highly stressed, and I would ask all members to co-operate whole-heartedly in this and other statistical schemes, in order that the data may be complete and accurate, as otherwise they will lose much of their value. A reason that is often advanced against providing statistics is that confidential information of great value would thereby be disclosed, but schemes are being so framed as to reduce the risk of such a disclosure to a minimum, and no cause for complaint has arisen from those sections in which the collection of production figures is already in operation.

### Model Safety Rules

To turn to the subject of safety, I wish to pay a tribute to the very valuable work which has been and is being done by the Works Technical Committee under the chairmanship of our treasurer, Dr. E. F. Armstrong. Part I. of the Model Safety Rules has recently been issued in provisional form; we have received many letters of appreciation from our members, while there have been glowing eulogies in the Press. There has consequently been a big demand for copies and nearly 800 have already been distributed. The object of Part I was to bring together, in a clear and concise form, the various principles which require consideration in connection with various types of dangerous manufacture in order that essential precautions may not be inadvertently overlooked in commencing some new manufacture. Members who have their own safety methods already very fully developed have expressed their appreciation from the point of view that the issue and discussion of the rules have led to a careful review of their own precautionary measures and have revealed a number of points worth consideration. The preparation of Part II is now actively in hand, but will of necessity take some time

to complete as information has to be collected and correlated from all available sources at home and abroad. The object of Part II is to amplify Part I, and to bring together in the form of a text-book convenient for everyday use, the large amount of valuable information regarding safety measures in chemical works which is either available in scattered publications and reports, or which, while in the possession of individual manufacturers or of the Government Departments concerned, remains as yet unpublished. We hope to produce a publication of great value to the chemical industry, and to set an example to other industries. It is desirable in every way for the chemical industry to take a lead in drawing up an adequate code of safety precautions of its own and ensuring that they are fully applied where any danger exists.

Closely connected with this is a new venture which was undertaken on the recommendation of the Works Technical Committee, namely, the issue of Safety Circulars, which consist of information which comes to hand from time to time in connection with accidents or their prevention in chemical works. These circulars appear to be supplying a definite want, since there has been a large demand for them from our members and from those of our affiliated associations. The normal issue of each circular is about 900 copies. The co-operation of all members in this safety work is urgently required, and we would ask you to submit to the Association any information you may have or which may come to your knowledge which would be useful in the preparation of Part II of our Model Safety Rules and of new Safety Circulars. The Council wishes to express its sincere appreciation of the valuable help which the Home Office is giving in this connection in placing its experience at the disposal of the Works Technical Committee. If we are going to have a new Factories Bill, it is very important that we should have these Model Safety Rules applied, so that we make sure that the new Bill follows the lines that we recommend with regard to the chemical industry. That we have to impress on the Department.

### Chemotherapy

I have no special comments to make regarding the useful work of standardisation which is going on in connection with tests for tar products, or on the subject of the fine chemical, dyestuff and wood distillation industries. The new scheme of co-operation between the Chemotherapy Committee of the Medical Research Council and the Association will, I feel sure, be of benefit to both sides. The work of the Resistant Metals Committee is proceeding along satisfactory lines, but there is still a great deal to do and the maintenance of the closest co-operation between all parties concerned will be essential for the satisfactory solution of the difficult but very important problems involved.

The very important work of our Patents Committee, under the chairmanship of Dr. Ree, requires special mention. This committee was resuscitated as a result of the suggestion made by our treasurer at our last annual meeting, and has been actively engaged since the end of last year in reviewing the existing British patent legislation primarily from the point of view of the chemical industry. This work was undertaken before there was any indication that the Government intended to move in the matter. Now that the Board of Trade has appointed a strong and representative committee to investigate the whole subject, it is essential that the defects in our patent system, from which the chemical industry has been suffering, should be brought to its notice in an authoritative manner. We feel that it is of the utmost importance that a single agreed memorandum should be submitted on behalf of all the bodies connected with chemistry and the chemical industry, rather than that each should submit a report of its own with perhaps differences on points of detail. Arrangements to this end have been made, and the Patents Committee will be the body responsible for drawing up the memorandum to represent the views of chemistry. In this way we hope to ensure that chemistry will speak with one voice on the subject of our patent legislation, and that as a result we may be able to secure the reforms of which we are in need. It is extremely satisfactory that we started the review of the patent legislation in time and that we have been selected as the body to draw up the agreed report.

The Chairman spoke very favourably of the monthly summary of information on chemical trade, one of their important new features, and added that the Traffic Committee had continued to perform its very valuable work, and had been able to obtain from the railway companies various concessions and improvements in regard to rates and regulations which would be of considerable financial benefit to members.

The last item in the report, he stated, deals with the various bodies on which the Association is represented and with which it has active dealings. We have, in the past year, established relations with the corresponding organisations in America, Belgium, France, Germany, Italy, Sweden and Switzerland, and have obtained useful details of their constitution and activities. As regards the work ahead of us, we shall continue to keep a close watch on all new legislation to see that due consideration is given to the interests of our industry. In conclusion, I wish to express my appreciation of the work of the staff and to thank them for their loyal services. Without their willingness and energy, it would not have been possible to have done what we have. (Applause.)

### Appeal to Fine Chemical Makers

Mr. C. A. Hill, in seconding the report, referred to the necessity of keeping the Board of Trade fully informed of the activities of the industry in all its branches. In particular he mentioned the possibility of new legislation in connection with the Safeguarding of Industries Act and expressed the opinion that the fine chemical makers should view the situation with extreme alertness, but that their alertness should be tempered all the while with confidence that no Government, whatever its political views, could do anything which would mean the scrapping of the work that had been done, and jeopardising the capital which had been sunk, under an Act of Parliament which had been given for ten years. He asked the fine chemical makers to take that view, but, nevertheless, to bear in mind the very pregnant remarks which the Chairman had made on the necessity of preparing really reliable and full statistics which could enable the Association to present a convincing case at the moment when it was called upon to do so.

After the honorary treasurer (Dr. E. F. Armstrong) had made a statement regarding the accounts, a general discussion followed.

The Rt. Hon. J. W. Wilson, in commenting appreciatively on the Chairman's address, referred to the fact that there were still a number of firms engaged in the chemical and closely allied trades which were not members of the Association, and stressed the importance of securing them as members of the Association or of its affiliated bodies, in order that the Association might be representative of the whole of the industry. He congratulated the general manager upon the popularity and the increasing interest and completeness of the Monthly Summary on Chemical Trade.

Mr. R. G. Perry referred to the importance of statistics, and urged the chemical industry to give all the information they could in connection with the 1931 Census of Production. At present the chemical industry ranked third as regards the amount of information supplied, but he strongly recommended that they should endeavour to be first.

### Collective Research

Dr. E. F. Armstrong suggested that the Council might profitably turn its attention in two directions. He thought that the new Government would be far more receptive to science and its applications than, perhaps, some previous Governments had been, and that they might well make representations so that the Association, or its members, might in some way form an advisory panel to the departments of the Government. On the second point, experience during the past year had led him to believe that there was a good deal more room for collective research by the Association; there were certain sections where research was going on in individual firms, but there was no collective research on big problems of common interest. He thought there was an opportunity in respect of certain sections of chemical industry for such collective research; those sections were badly in need of it and it might help them to solve problems which were much too wide and too costly to be attacked by individual firms.

The Chairman then put the resolution to the meeting, and declared the report and accounts unanimously adopted.

### Election of Auditors

On the motion of Mr. K. H. Wilson, seconded by Mr. C. S. Dingley, Feasey and Co., who have now changed their name to Feasey, Hull and Hornsby, were re-elected auditors.

The reception of the general manager's report on the nominations for council and for group committees and a vote of thanks to the Chairman, proposed by Mr. R. M. Bewick, concluded the business.

## Chemical Manufacturers' Annual Dinner

### List of Guests

THERE was a distinguished company at the annual dinner of the Association of British Chemical Manufacturers at the May Fair Hotel, London, on Thursday, July 18. Dr. G. C. Clayton, chairman of the Association, presided, and there were a few informal speeches and toasts. In addition to the toast of "The King," the chairman proposed that of "His Majesty's Ministers," to which Mr. W. R. Smith, M.P., replied. The other toasts were "The Guests," proposed by Sir D. Milne-Watson, and responded to by Sir Arthur Duckham and Mr. Lennox Lee, and "The Chairman," proposed by Dr. Levinstein and acknowledged by Dr. Clayton.

The following is the list of guests :—

Colonel Aitken, Mr. G. G. Aitken, Mr. J. Allan, Mr. L. Anderson, Mr. M. P. Appleby, Dr. E. F. Armstrong, Mr. Percy Ashley (Board of Trade), Mr. J. Baddiley, Mr. F. W. Bain, Mr. E. A. Bearder, Mr. R. R. Bennett, Mr. H. H. Berresford, Sir Charles H. Bird, Mr. E. J. Boake, Mr. Bradbury, Mr. J. M. Bush, Mr. W. A. S. Calder, Mr. C. E. Carey, Dr. F. H. Carr, Mr. P. H. Chambers, Mr. F. E. J. China, Mr. W. H. Clark, Dr. G. C. Clayton, Mr. R. H. Clayton, Dr. J. T. Conroy, Mr. E. Bernard Cook, Mr. A. Hayton Cowap, Mr. C. J. T. Cronshaw, Dr. H. H. Dale, Mr. R. H. Davidson, Sir Malcolm Delevigne, Mr. R. M. Drake, Sir Arthur Duckham, Mr. J. H. Dunnington, Mr. D. H. Owen Edmunds, Mr. E. V. Evans, Mr. J. Ewing, Dr. J. Vargas Eyre, Mr. J. Fairgrieve, Mr. G. T. Feasey, Mr. M. W. M. Fell, Mr. H. Fergusson, Mr. A. W. Flux, Mr. W. C. Forbes, Mr. Homer S. Fox (U.S.A. Trade Commissioner), Mr. H. C. Gant, Lieut.-Gen. Sir Webb Gillman, Mr. E. O. Glover, Mr. J. R. S. Goodall, Mr. N. H. Graesser, Mr. F. E. Hamer, Mr. R. S. Haskew, Mr. C. G. Hayman, Mr. H. C. Hanrott, Dr. H. Hepworth, Mr. E. H. Hickman, Mr. B. Hickson, Mr. C. A. Hill, Mr. A. Hittinger, Mr. A. J. Holden, Mr. G. E. Holden, Mr. R. S. Horsfall, Mr. D. Lloyd Howard, Mr. G. E. Howard, Major H. Lloyd Howard, Mr. B. B. Houston, Mr. W. M. Hoyle, Dr. P. C. C. Isherwood, Mr. H. W. James, Mr. H. Finnis Johnson, Mr. H. E. Jones, Mr. N. H. B. Keysor, Mr. A. A. King, Mr G. H. K. Kingdon, Mr. Lennox B. Lee, Dr. H. Levinstein, Mr. F. W. Lewis, Dr. J. A. Lloyd, Mr. H. D. Lorimer, Captain J. A. MacArthur, Mr. D. R. Mackay, Mr. I. Miki, The Hon. Henry Mond, M.P., Mr. Robert L. Mond, Professor G. T. Morgan, Mr. R. Morris, Mr. T. D. Morson, The Hon. Hugh Fletcher Moulton, Major P. Murphy, Mr. F. G. Murray, Sir Roland T. Nugent, Mr. J. H. Olliver, Mr. D. W. Parkes, Mr. S. E. Parkhouse, Mr. P. Parrish, Mr. A. E. Peak, Mr. G. E. Pearson, Mr. F. M. Potter, Mr. J. Davidson Pratt, Dr. F. L. Pyman, Mr. A. Rae, Mr. E. Brotherton Ratcliffe, Mr. J. Arthur Reavell, Mr. H. W. Robinson, Mr. S. Robinson, Mr. J. Rogers, Mr. W. E. Sanderson, Mr. A. Sharp, Mr. W. Sheldon, Mr. W. A. Short, Mr. H. C. Smith, Mr. W. R. Smith, M.P., Mr. P. G. Somerville, Mr. A. J. Skelton, Mr. E. Spence, Mr. J. L. Steel, Mr. J. Sutherland, Mr. N. Garrod Thomas, Professor J. F. Thorpe, Mr. W. B. Threlfall, Mr. H. T. Tizard, Mr. E. Wallace, Sir David Milne-Watson, Mr. I. E. Weber, Mr. A. P. Webster, Mr. G. Goodman Whiffen, Mr. S. W. Whiffen, Mr. F. Wilkinson, Mr. A. C. Wilson, Mr. K. H. Wilson, Mr. T. M. Willcox, Mr. W. J. U. Woolcock, and Mr. G. E. H. Yonge.

## The Soap Makers' Directory

THE thirty-second edition of *The Soap Makers' Directory*, 1929, has been issued by Simpkin Marshall, Ltd. (pp. 86, 2s. 6d.). It is a list of the principal manufacturers of soap in Great Britain, with some of those in Ireland, to which is appended a list of candle makers in Great Britain. Under each entry the names of the products manufactured are given. In addition, there is a classified list of soaps, showing the makers of the principal kinds.

## British Chemical Trade

### From an American Angle

THE following extracts are taken from the annual review of British Chemical Trade recently issued by Mr. Homer S. Fox, U.S.A. Trade Commissioner in London :—

### Sodium Compounds

Sodium compounds rank among the most important chemicals in the export trade, both as to quantity and value. Keenly competitive conditions prevailed during 1928 in the borax trade between the imported and the domestic article, and there was a considerable drop in prices during the year. Total imports, almost entirely from the United States, increased about 27 per cent. to 149,710 cwt., but because of lower prices the values showed a much smaller increase. Competition has been mainly in the commercial grades, the B.P. qualities apparently not having been affected to any extent. Similar conditions prevailed in the boric acid market

The bulk of the domestic business in sodium products is in the hands of the domestic makers, and their relative position under Imperial Chemical Industries, Ltd., appears to have been materially strengthened, especially in regard to caustic soda and the carbonate group. Dealers, however, continue to handle much of the chromate and bichromate trade, and competition in these products has kept prices unusually low. Largely as a result of this situation, it is understood an agreement was reached in 1928 between British, Continental, and American makers of bichromates under which production is to be limited.

There is understood to be a growing demand for caustic soda, and extensions and reorganisations of plants are being made to meet the additional requirements.

### Hydrogenation of Coal

In addition to low-temperature carbonisation, experimental work on the hydrogenation of coal by the Bergius system has been carried on, particularly at the fuel research stations at Billingham and Greenwich, operations at the former being conducted on a comparatively large scale. For a considerable period work on this system was carried out in the laboratory at Birmingham University.

In a paper read by J. Ivon Graham before the London section of the Society of Chemical Industry, it was stated that the results of this work, which had been started in 1923 and had been financed by the Colliery Owners' Research Association, showed that the same degree of hydrogenation, working on British coals, had not obtained as in Germany as indicated by Bergius. In other words, the experiments at Birmingham apparently showed a lower yield of oil and a higher yield of residue than in the case of the German experiments, although an exact comparison could not be made.

The Birmingham experiments also indicated that the use of a catalyst improves the degree of hydrogenation and reduces the amount of residue. General opinion appears to be that considerable further work must be done before any substantial commercial results can be expected from the hydrogenation of coal.

So far as hydrogenation is concerned, the Government fuel research station is limiting its efforts in the direction of various technical aspects, while the experimentation in connection with commercial development is being left to Imperial Chemical Industries, Ltd., which holds a controlling interest in the British Bergius Syndicate.

### Sales Conventions

Most chemicals sold in Great Britain are now subject to sales conventions or agreements, which relate chiefly to price regulations, although in some cases production control likewise was established. A number of items, especially in the heavy chemical field, are now in the hands of Imperial Chemical Industries, Ltd., the principal British chemical group, so that output and price control is simplified. Among other chemicals and chemical materials which became subject to agreement during 1928 was white lead, both imported and domestic, which was included during April. Aspirin, hydroquinine, potassium permanganate, and salicylic acid in the pharmaceutical section, and barium chloride and sodium bichromates in the industrial section were among the chemicals which were understood to have been brought within the scope of sales-convention arrangements.

## Economic Situation in Italy

### Conditions in the Chemical Industry

THE report on "The Economic Situation in Italy" (H.M. Stationery Office, pp. 105, 3s.), dated April, 1929, by Mr. E. C. Donaldson Rawlins, commercial counsellor, and Mr. H. C. A. Carpenter, Ph.D. (Bonn), commercial secretary, British Embassy, Rome, contains short chapters on the Italian chemical industry. The effort, it is stated, to free the national market from foreign products and to open new outlets abroad for Italian chemical products has been continued with a certain amount of success. The total values of imports of chemicals are slightly less and those of exports slightly higher in comparison with the preceding year. The activity of the factories has been maintained almost normal, except for a few branches which have met with greater difficulties and have been obliged to close down their works or to dismiss their workmen. The heavy chemical industry has been well occupied, but in a few branches (sulphate of magnesium, chromates, chlorides) it has felt strongly foreign competition.

The dyestuff industry has felt the effect of a weak home demand, due essentially to diminished activity on the part of the consuming industries; nevertheless, at the end of the year the situation improved considerably. The manufacture of intermediary products was fairly active owing to the satisfactory demand both of the home and foreign markets.

The tartaric industry, which progressed favourably at the beginning of the year, was less satisfactory later. The citric acid industry, on the other hand, has done well and has succeeded in developing sales abroad.

The industry of essences and perfumes, which has developed considerably in the last few years, has done well and promises better in the future. Other industries which have done well are paints and varnishes, polishes, inks and similar articles. Those that have met with considerable difficulties are the seed oil and the soap industries.

### British Trade

On the whole 1928 was slightly better for British trade than 1927. Italian production is steadily increasing, articles such as citric and tartaric acid and acetic acid are now being largely produced. Germany still provides the greatest part of the imports, both industrial and medicinal.

British pharmaceutical preparations of a high class have benefited by the stabilisation of the lira and have made satisfactory progress notwithstanding the high tariff. Finished articles in imitation are being produced, but British goods enjoy a high reputation, and in spite of the higher cost there is still room for expansion.

The only soap importations of any note are from France. About six tons of transparent soap are imported annually, the chief suppliers being Great Britain and Germany. A well-known American firm has been working hard in this market for the past two years and has met with considerable success. Their soap is now manufactured in Milan. As regards shaving soaps and dentifrice the products of a British concern are widely distributed; these are also manufactured in Italy. Towards the end of 1928 an American firm, who are now associated with the former American firm, strengthened their sales organisation in Italy and launched a sampling scheme.

With the exception of the Marseilles soap, which is largely a bulk trade, the soap products that are meeting with success are being manufactured in Italy. The high f.o.b. cost of British goods, plus the heavy import duty, involves selling prices beyond the purchasing power of the Italian public, with the result that business in imported specialities is necessarily restricted. Two other British brands, formerly imported from England and now manufactured in Italy, are steadily gaining ground despite severe competition.

## Inauguration of Bussey Coal Distillation Works

IN the absence of the Home Secretary, Viscount Elmley, M.P., performed the inaugural ceremony on Friday, July 19, in regard to the Bussey Coal Distillation Works at Glenboig, Lanarkshire. The installation consists of fourteen retorts, mounted on concrete bases, equipped with power-house and storage tanks, and capable at full pressure of dealing with over 500 tons of coal per day. The process has been for three years in operation at Louisville, Kentucky.

## Better British Salesmanship

### Eleven Good Rules

IN view of the Prince of Wales's recent call for better salesmanship, the British Chamber of Commerce in Paris republishes in its monthly bulletin the following "Byewords for the conduct of British trade abroad," originally issued in 1918:—

1. Teach your boys one or more foreign languages, but teach them at an early age and thoroughly.
2. Send your young men abroad for study and for commercial training.
3. Study the requirements of foreign markets and make your goods to suit them.
4. Employ British travellers speaking your prospective customer's language in preference to soliciting by post.
5. Quote your customers in the weights and measures and currency of their country.
6. Quote for your goods delivered at your customer's door. Shipping agents will invariably quote free delivery, duty and all charges prepaid.
7. Your catalogues should be printed in your customer's language.
8. Endeavour to meet your customer's requirements from the point of view of credit.
9. Correspond with your customers in their own language and not in your own.
10. Help to maintain the high standard of British commercial integrity.
11. Make use, through your travellers and by correspondence, of our Commercial Attachés and Consuls and also British Chambers of Commerce abroad, who are able to help your business in very many ways.

## A Chemical Prophecy

IN an article on "The Chemistry of the Farm," published in our issue of July 6, a quotation was given from the now historic speech of the Marquis of Salisbury at the jubilee of the Chemical Society in 1891, in which he suggested that our future supplies of nitrogen for agricultural purposes might be obtained, not from Chile, but from the "circumambient air." A correspondent has been good enough to send us an extract from a still earlier address on the same subject—one given to the Chemical Society by Dr. Ludwig Mond in 1889. Dr. Mond on that occasion stated: "Through the classic researches of Lawes and Gilbert, who proved, in opposition to no less an authority than Liebig, that ammonia is a most valuable manure which enables us not only to maintain but multiply the yields of our fields, and thus to feed on the same area a much larger number of inhabitants, the immense importance of an abundant supply of ammonia, more particularly for the old world, with its teeming population and worn-out soil, has been apparent to everyone." It is interesting to note how energetically Lord Melchett is engaged to-day in supplying the very needs that his father indicated just forty years ago.

## Ammonium Sulphate: August and September Prices

NITRAM, LTD., announces that the prices of sulphate of ammonia for home agricultural use will be, for the months of August and September, £9 9s. per ton for neutral quality guaranteed to contain 20·60 per cent. of nitrogen by weight and not to contain more than 0·025 per cent. of free acid and to be in readily friable condition at the time of delivery. These prices include delivery to customers' nearest station or wharf in Great Britain, for prompt cash payment in lots of 6 tons and upwards, packed in single bags containing about 2 cwt. net to be supplied free by sellers.

In fixing these prices, the 1s. per ton rebate on railway carriage which was allowed during a part of last season, to give buyers the benefit of the Derating Act, has been taken into account, so that in future no rebate or allowance of this nature will be made. The right is reserved to raise prices at any time by sending out a printed notice to that effect. Any such increase in price will apply to all orders received after the date of issue of the notice.

As practically no ordinary quality is likely to be available, no price is quoted for this quality.

# The Relation of Organic Chemistry to Biology

## Professor Barger's Address to the British Association

*The British Association for the Advancementof Science is meeting this year in South Africa. Last week was spent in Cape Town, and on Tuesday Professor G. Barger, F.R.S., president of the Chemistry Section, delivered his presidential address, entitled "The Relation of Organic Chemistry to Biology." The more important points in the address are noted below.*

SINCE the British Association first met in South Africa, Afrikaans has become an official language, and I will therefore take as my point of departure the Dutch word for chemistry, still commonly used in Holland: Scheikunde, the science of separating. Since, in the last resort, we are dependent on naturally occurring materials, which hardly ever occur in a state of purity, it follows that the early chemists were even more concerned with separating one substance from another than many of us are to-day. Later the chemical investigation of organic material was apt to consist in destructive distillation, naturally adding little to knowledge. Only the more volatile and stable substances could be isolated in this fashion. Thus, in 1770, four acids were known, formic and acetic, obtained by distillation, succinic and benzoic, obtained by sublimation.

### The Work of Scheele

An important systematic advance was made by C. W. Scheele (1742–1786), whose contributions to organic chemistry are almost as important as his discovery of oxygen. Scheele investigated a number of organic acids in the wet way. He obtained tartaric acid in 1769, and later benzoic acid by boiling gum benzoin with lime. He first prepared lactic acid (1780) from sour milk, and mucic acid by oxidation of milk sugar. When soon afterwards mucic acid was also obtained from gum tragacanth, it became evident that one and the same substance may be derived from both animal and vegetable sources. Scheele also obtained citric, malic, and even gallic acid by crystallisation from solution. Of more general biological interest is his discovery of uric acid, of glycerol and of hydrocyanic acid. Scheele's discovery that esterification is greatly furthered by the presence of mineral acids later became important in connection with catalysis.

There were those who were attracted by theoretical questions. Such were Gay-Lussac, Bunsen, and Frankland, who investigated radicles; Dumas, Gerhardt, and Laurent, who evolved the theory of substitution and of types; Wurtz, Hofmann, and Williamson, the forerunners of Kekulé in establishing the theory of structure, which soon became the common ground of all organic chemists.

### A Bound Forward

A knowledge of structure gave a great impetus to organic synthesis, not only in the laboratory, for theoretical purposes, but also in the factory for practical uses; the manufacture of dyes, of synthetic drugs, of explosives became an important industry. The number of known carbon compounds grew at an enormous rate. In 1883 some 20,000 were registered in Richter's Lexicon, in 1899 74,000, in 1910 144,000, and the number now is probably not much short of a quarter of a million. More than half of these are derived from coal tar, and only a small proportion occur in animals and plants. Instead of being the chemistry of organised beings, organic chemistry became the chemistry of carbon compounds. Until the present century the proportion of chemists who, like Scheele, were interested in natural products steadily declined and biology became of little interest to chemists as a whole, but physiologists have more and more realised the importance of chemistry for their subject and the intermediate subject of biochemistry has rapidly developed.

The systematic study of natural products, inaugurated by Scheele, was at first continued most successfully in France, by Fourcroy, Vauquelin, and their pupils. Both were at the Jardin des Plantes, and Vauquelin was afterwards at the Faculté de Médecine. Conjointly they discovered urea and hippuric acid, Vauquelin allantoin and asparagin. In 1800 about twenty acids were known, but only one hydrocarbon (ethylene) and one alcohol.

As a result of Emil Fischer's work the new science of biochemistry was firmly established in the beginning of the present century, and the year 1906 marked its recognition in three countries, when three new journals first appeared: the *Biochemische Zeitschrift* in Germany, the *Biochemical Journal* in Britain, and the *Journal of Biological Chemistry* in America. The interest of German organic chemists in substances of general biological importance may be further illustrated by Willstätter's work on chlorophyll, carotin, the anthocyanins and enzymes, by Windaus' investigations on the sterols, by Wieland's work on the bile acids and by Hans Fischer's study of the porphyrins, which recently resulted in the synthesis of hæmin.

### British and German Work Compared

British organic chemists appear to be more interested in theoretical problems. During the years 1927 and 1928 about 580 papers on organic chemistry were published by the Chemical Society, constituting much the largest portion of the *Journal*. Of these, rather less than 20 per cent. may be said to deal with natural products and were inspired largely by W. H. Perkin (himself a pupil of Baeyer) and by Perkin's pupil, Robinson. About 45 per cent. of British papers on organic chemistry are more or less directly concerned with such theoretical questions as stereochemistry, the nature of valency, reactivity, tautomerism, and the remaining 35 per cent. deal with the synthesis of new compounds devoid of theoretical and biological interest, although occasionally having practical importance.

German organic chemists seem to be more interested in natural products. Of the organic chemical papers in the *Berichte* for 1928 about 40 per cent. are concerned directly or indirectly with such substances. It should not be supposed that organic chemical theory is wholly unconnected with biology. An example out of many will show the contrary. When a protein is "racemised" as far as possible, by Kossel's method, by leaving it for some weeks at 37° in half-normal alkali, it is found that certain aminoacids retain their optical activity, and these Dakin has assumed to be the ones with free carboxyl groups, situated at the ends of chains.

### The Structure of the Proteins

Crystallised albumins from the whites of hens' and ducks' eggs are very similar and seem to be composed of the same units in equal amounts, but Dakin found that three amino-acids, leucine, aspartic acid, and histidine, behave differently to alkali in the two molecules, and appear to occupy different places. Hen's albumin has some aspartic acid but no leucine or histidine on the periphery; duck's albumin, on the other hand, has no aspartic acid, but some leucine and histidine on the outside of the molecule. By the very sensitive anaphylactic reaction of the isolated guinea-pig's uterus, Dale showed that the two proteins are specifically different as antigens. Differences in arrangement, even of the same amino-acids, help to differentiate the proteins of various species. It is on the diversity of the proteins that the difference of species is based.

Whilst organic chemists are often eager to investigate the constitution of animal and vegetable substances, they are less ready to undertake the preliminaries of purification and isolation, and are therefore less apt to discover new ones. By esterification and by the use of a high vacuum, Emil Fischer made the monamino acids amenable to fractional distillation, a standard operation of organic chemistry. He discovered several new members of the group.

But most substances of physiological interest require a special technique, on the development of which the biochemist may spend much labour. Thus Kossel showed how to separate the purine and pyrimidine bases of the cell nucleus, and the important diamino-acids, histidine, arginine, and lysine. Hopkins, by his special reagent, was able to isolate tryptophane, the parent substance of indigo, long after indigo itself was being manufactured synthetically. Dakin found that monoamino acids can be extracted from aqueous solution by butyl alcohol, and, using this new technique and Foreman's method of separating aspartic and glutamic acids by their calcium salts, Dakin discovered hydroxyglutamic acid, an entirely unsuspected unit of protein.

The isolation of some natural substances, of great physiological interest, is beset with difficulties because they are present in minute amount and have not the convenient solubility relations which facilitate the separation of the alkaloids. This applies to the hormones present in animal tissues. Here the American slaughter-houses provide valuable facilities, and it is significant that adrenaline, thyroxine, and insulin were first crystallised in America, although the constitution of the two former hormones was later established in Europe, where also their synthesis was effected, that of thyroxine only a few years ago, through the brilliant work of Harington.

### Vitamins

The difficulties of isolating vitamins are still more formidable; in the case of the antineuritic vitamin B, which is almost certainly a fairly simple substance, susceptible to attack by the methods of organic chemistry, most progress towards isolation has been achieved by selective adsorption and elution, the methods employed by Willstätter for enzymes. The discovery by Rosenheim and Windaus that vitamin D is formed by the irradiation of ergosterol has suddenly brought into prominence a substance which before was but a curiosity, chiefly known through the work of the French pharmacist, Tanret. At the same time the interest of biochemists in photochemistry has been stimulated, as well as in the extensive work of Windus on the structure of cholesterol, which the latter had already shown to be connected with the bile acids, largely investigated by Wieland.

The sudden emergence of ergosterol into prominence does not stand alone; another of Tanret's ergot substances, ergothioneine, at first also an isolated curiosity, has acquired more general significance because it has been found in mammalian red corpuscles; it is likely that this will ultimately lead to the discovery in proteins of yet another sulphur-containing amino-acid, possibly a thiol histidine. Altogether ergot has yielded more substances of general biological interest than any other single plant.

### Dynamic Biochemistry

The above examples of the relation between biological and organic chemical work relate to that division of biochemistry which may be termed descriptive. A knowledge of structure is also necessary in dynamic biochemistry, the study of the transformations which substances undergo in the living organism. The recognition of the fats as esters, and their behaviour to fat-splitting enzymes, the transformation of starch into sugar under the influence of diastase, the end-products of alcoholic fermentation, all these were early discoveries in dynamic biochemistry.

But just as the organic chemist may wish to know the mechanism of a reaction, for instance of the Skraup synthesis of quinoline, so the biochemist wishes to know the intermediate steps in the transformation of, say, glucose into alcohol. The detection of these stages of metabolism is a matter of considerable difficulty, since under normal conditions the intermediate substances generally disappear as rapidly as they are formed. They have to be trapped by suitable means, as did Neuberg with acetaldehyde in alcoholic fermentation, or the metabolic process may sometimes be cut short, by using an isolated organ, such as the surviving liver, or the precursor of the intermediate substance may be administered in large excess.

Very little has been learned in this respect from the higher plants. The very process of photosynthesis is still beset with obscurity in spite of a plausible hypothesis; we know next to nothing about transformation of carbohydrate into fats, and *vice versa*, and in particular we are ignorant of the stages by which amino-acids are formed in plants from nitrates and carbohydrates; we simply do not know how the proteins of living beings originate. Nor have the higher plants given us much information of the way in which their fats, carbohydrates, and proteins are ultimately broken down.

Our knowledge of catabolism is principally derived from the animal world. It is found that the breakdown does not always occur in the manner in which the organic chemist would expect. Knoop has shown that in the animal organism the β-carbon atom is attacked so that the chain is shortened by two carbon atoms at a time, an acid with 18 carbon atoms being converted successively into one with 16, 14, 12, etc. In accordance with this scheme, the principal fatty acids in nature are those with an even number of carbon atoms.

Among characteristic plant constituents perhaps most chemical labour has been expended in the alkaloids, which are usually restricted to a particular order, genus, or species. The main biological interest of alkaloids is not botanical, in their distribution, but pharmacological, in their action. This leads to a mention of the great developments in synthetic drugs, due to organic chemistry. In particular there is great scope for the organic chemist in chemotherapy, the combating of general infections of the host by synthetic drugs. The production of salvarsan, which made such a great change to the treatment of syphilis and other protozoal diseases, and the subsequent introduction of germanin (or Bayer 205) in the treatment of sleeping sickness, indicate great possibilities of applying organic chemistry to this particular department of medicine, and constitute a link between workers in very different fields.

### Chemist or Biologist?

I have called attention to the many points of contact between organic chemistry and biology in the past and present, and if finally I am permitted to draw a conclusion it would be an educational one. I hold it to be desirable that biologists should have at least an elementary knowledge of organic chemistry in spite of the difficulties imposed by ever-increasing specialisation in science.

Professor Lovatt Evans (in his last address to the Physiology Section), discusses the question, "much debated in private, though little in public," whether a biochemist should be primarily a chemist or a biologist. He sees no reason why the biochemist should not be both. I imagine the biochemist cannot be both equally from the outset, but he may aspire to be both, or alternatively, biochemists can be made both out of chemists and out of biologists. Once more I heartily agree with Professor Lovatt Evans when he writes: "If he must have one label, it is better that of the chemist, provided always that the biochemist works in the closest possible association with the physiologist. This is most essential if both are not to be deprived of much valuable interchange of ideas and, on a lower plane, of materials and apparatus. In fact, I am convinced that within the limits of administrative possibility, the greater the variety of workers brought together the better the results.

## The British Association in South Africa

THE British Association for the Advancement of Science, which is meeting this year in South Africa, began its discussions in Cape Town on Monday. Sir Thomas Holland will deliver his presidential address ("The International Relationship of Minerals") next week, in Johannesburg. The University of South Africa is conferring the degree of D.Sc. on various members of the Association, including Sir John Russell, F.R.S.

## Nitrate Deposits in South-West Africa

AT Thursday's session of the chemistry section of the British Association, at Cape Town, Professor J. S. Thomas read a paper entitled "Recently Discovered Nitrate Deposits in South-West Africa." Two Government proclamations have been issued giving the area of the deposits as 32,000 square miles. The finders desired that the first announcement of the discovery should be made at the meetings of the British Association.

## Canadian Salt Production

THE Dominion Bureau of Statistics at Ottawa has forwarded to the High Commissioner of Canada in London a bulletin presenting the finally revised statistics relative to salt production in Canada last year. In 1928 deliveries of salt totalled 299,445 tons, valued at $1,495,971, an increase of 11·5 per cent. in quantity, but a decrease in value of 7·3 per cent. as compared with the 1927 production. The average price for all grades was $5 per ton. Ontario's production of 279,841 tons accounted for 93·5 per cent. of the total output, although the production at the Malagash mine in Nova Scotia showed an increase of 36 per cent. during the year. Importation of salt into Canada during the year increased by 7 per cent. to a total of 189,025 tons, valued at $1,122,968. Exports of Canadian salt totalled 2,930 tons, worth $36,399.

# Chemical Engineering Examinations

## Papers Set for the Associate Membership

THE Associate-Membership Examination of the Institution of Chemical Engineers was held recently. Five papers were set, and, in addition, candidates were subjected to a *viva voce* examination. A selection from the papers appears below :—

### Home Paper, January—March, 1929

*The answers to this paper must be* POSTED *to the Institution of Chemical Engineers, Abbey House, Westminster, London, S.W.1, marked outside "*HOME PAPER,*" before* SATURDAY, MARCH 30, 1929. *The candidate may attempt* ONE *question only under section* A *and* ONE *question only under section* B. *Little credit will be given for correct answers when the method of attack of the problem and the calculations are not given. Where the slide rule is used, the method should be indicated. Correct graphical solutions will be credited with full marks.*

SECTION A.

1. Prepare a full set of flow sheets relating to the manufacture of 90° Tw. caustic soda and bleaching powder by electrolysis of brine. Assume that 26 cells of the diaphragm type will be available, each with a rating of 1,500 amperes at 4·25 volts, and that the weak solution from these cells will contain 125 gm. NaOH and 140 gm. NaCl per liter and draw up specifications and estimates covering :—

(*a*) Steam and power plant.

(*b*) Caustic soda plant.

(*c*) Bleaching powder plant for utilising half the chlorine output.

(*d*) Hydrochloric acid plant for utilising hydrogen and remainder of the chlorine.

Prepare a layout drawing of the installation and an estimate of the approximate return on the capital expenditure under present market conditions.

2. Design a plant for the manufacture of 5 tons a day of 24 hours of acetic anhydride from a recovered acetic acid containing approximately 20 per cent. acetic acid by conversion into sodium acetate and treatment with sulphuryl chloride. Draw up flow sheets for each stage of the process on which the balance of materials, energy, etc., are recorded and make specifications and estimates covering the entire plant. Make a general arrangement drawing of one unit of the apparatus. Report on the overall cost of the process.

3. Draw the general layout and give a flow sheet for a plant to manufacture 5 tons per day of 24 hours of mono-nitronaphthalene from pure naphthalene, sodium nitrate and sulphuric acid. Calculate the sizes of the different parts of plant, specify the materials from which they are to be made, and state what you would consider to be a reasonable allowance for depreciation in each case. Estimate the cost of production. The principles on which the layout is arranged should be clearly stated.

4. Design a plant for the manufacture of 95 per cent. alcohol (by volume) using 3 tons of maize per day of 24 hours as raw material. Draw the layout of the plant and give sketches showing important details. Estimate the overall cost of production. A detailed design of the still is not required, and, for the purpose of this question, any restrictions imposed by Excise regulations need not be considered.

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SECTION B.

1. Write an essay on the design of high pressure autoclaves for the manufacture of intermediate products for dyestuffs, incorporating a statement of the physico-chemical principles on which working pressures are predicted, special precautions in mechanical design and illustrate by calculating out a detailed design for an autoclave for the manufacture of dimethylaniline on a large scale. Prepare a drawing from which such an autoclave could be built by any engineering works having suitable facilities.

2. Write an essay on the principles of design of fractional distillation plant. Design a fractionating still for use in connection with the separation of ortho- and para-nitrotoluol from the usual mixture obtained by nitration of toluol, and compute approximately the thermal effixiency of the apparatus under what you consider to be practical conditions of operation.

3. 2,000 lb. per hour of dry saturated benzol vapour at atmospheric pressure enter a counter-current condenser consisting of 20 copper tubes, each of which is 25 ft. in length. 650 gallons per hour of cooling water, with an initial temperature of 60° F. are passing inside these tubes, which have an internal diameter of 0·375 in. and an external diameter of 0·559 in. To what temperature is the condensed benzol cooled and what is the exit temperature of the cooling water ? How much of the tube surface is being used for condensing the benzol vapour, and how much is being used for cooling the condensed benzol ?

Assume coefficients of heat transfer :—

| | |
|---|---|
| Water to metal .. .. .. | 500 B.Th.U./hr./sq. ft./°F. |
| Condensing benzol vapour to metal .. .. .. .. | 350 ,, ,, ,, |
| Liquid benzol to metal .. .. | 40 ,, ,, ,, |

4. In an experimental run at constant pressure on a leaf filter the following data are obtained connecting the volume of filtrate and the time of filtration :—

| VOL. OF FILTRATE— | | | | | | |
|---|---|---|---|---|---|---|
| ·5 | 1 | 2 | 3 | 4 | 5 | 6 cu. ft./sq. ft. of filtering area. |
| TIME— | | | | | | |
| ·12 | ·28 | ·72 | 1·32 | 2·07 | 2·98 | 4·06 hours. |

Under these conditions, find the maximum output of this filter and the volume (per sq. ft. of filtering area) to be filtered at each operation in order to give the maximum output. The filter-cake is to be washed with a volume of water equal to one-fifth of the volume of filtrate and the time required for emptying and reassembling the filter is 30 minutes.

5. An open cast iron tank 2 m. diameter by 3 m. deep is filled with water at 95° C. and exposed to still air. Plot the cooling curve from 90° C. to 30° C., assuming the atmospheric temperature to be 15° C., with a dew point of 10° C. What would be the weight of water evaporated in that time ? All formulæ employed should be given.

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### Written Examination

*Thursday, July 11, 1929, 10 a.m.—1 p.m.*

*Three hours are allowed for this paper. The candidate may use the reference books provided.* FOUR *questions only may be attempted,* TWO *to be taken from each part of the paper. Little credit will be given for correct answers when the method of attack of the problem and the calculations are not supplied. Where the slide rule is used the method should be indicated. The questions are not intended to test a knowledge of particular formulæ or industrial makes of plant. Full marks may be obtained by an answer which shows an appreciation of the salient principles involved and an ability to apply these to the purpose in view.*

SECTION C.—PART I.

1. What do you understand by turbulent and stream line flow ? Give the criterion.

A liquid of density 0·792 grs. per c.c., having a viscosity of 0·0033 c.g.s. units at 20° C. flows through a 1 in. pipe. Calculate the approximate velocity at which stream line flow breaks down and turbulent flow begins.

2. Describe any apparatus you would use to determine the calorific value of a fuel.

One gram of oil was burned in a bomb calorimeter containing 2,200 grs. of water, the water equivalent of the instrument being 481 grs.

The following observations of the temperature were recorded :—

| | | | | | | |
|---|---|---|---|---|---|---|
| | *Preliminary Period.* | | | | | |
| Time in mins. | 0 | 1 | 2 | 3 | 4 | 5 |
| Temp. ° C. .. | 10·23 | 10·23 | 10·24 | 10·24 | 10·25 | 10·25 |
| | *Burning Period.* | | | | | |
| Time in mins. | .. | .. | 5½ | 6 | 7 | 8 |
| Temp. ° C. .. | .. | .. | 10·80 | 12·90 | 13·79 | 13·84 |
| | *Subsequent Period.* | | | | | |
| Time in mins. | .. | 9 | 10 | 11 | 12 | 13 |
| Temp. ° C. .. | .. | 13·82 | 13·81 | 13·80 | 13·79 | 13·78 |

Calculate the calorific value of the oil.

3. Sulphur of 99·4 per cent. purity is burned at the rate of 700 lbs. per hour. The air enters the burner at a temperature of 15° C. and the gases leaving at 760° C. contain 17·4 per cent. $SO_2$ and 2·7 per cent. of $O_2$ by volume.

What is :—

(*a*) The percentage of $SO_3$ formed in the gas ?

(*b*) The weight of sulphur dioxide produced per hour ?

(*c*) The volume of air required ?

4. What do you understand by the coefficient of heat transfer, and determine this in the following case.

A pipe $1\frac{1}{4}$ in. diameter by 20 ft. long is surrounded by a second pipe 2 in. in diameter. 850 gals. of water per hour enter the inner tube at a temperature of 220° F. and leave at a temperature of 120° F., whilst another liquid flows in the opposite direction through the annulus, entering at 60° F. and leaving at 190° F.

5. A steel pipe 4 in. in diameter by $\frac{1}{4}$ in. thick carries steam at 100 lbs. per sq. in. pressure (gauge). The outer surface of the pipe is covered with a layer of asbestos 2 in. in thickness and is surrounded by air at a temperature of 15° C. Calculate the temperature of the outside of the asbestos, if the conductivity of the asbestos is 0·216, and of the iron 40·68 cals. per sq. m. per °C. per m. thick per hour. Heat loss from the asbestos surface

$= 3{\cdot}65\ (T_a^4 - T_b^4) \times 10^{-8} + 3(T_a - T_b)^{1{\cdot}23}$ Cals./sq. m./hr.

Where $T_a$ is temperature of surface, and

$T_b$ is temperature of surroundings.

Cals. = large calories.

SECTION C.—PART II.

6. Describe the air lift pump, and state how the energy supplied to the pump is utilised or dissipated.

7. Give the cycle of operations in any type of refrigerator with which you are acquainted. State the various materials used as refrigerants and indicate briefly the importance of refrigeration to the chemical engineer. State how refrigerating machines are usually rated and discuss critically the value of such ratings.

8. Describe with sketches one only of the following :—

(*a*) A gas-fired reverberatory furnace for calcining material at 1,000° C.

(*b*) A furnace suitable for burning sulphur.

(*c*) A muffle furnace.

9. Describe with good sketches the type of plant you would propose to instal for the movement of any two of the following materials :—

(*a*) Hot coke from a gas retort.

(*b*) Very short pieces of cotton which have just left a drying machine and have to be moved to a higher level for packing.

(*c*) Powdered cement from the ball mills to the silos in a cement factory.

(*d*) Salt coming from a large vacuum evaporating plant.

10. Sketch a brickwork setting suitable for a tar still. What would be the effect of reducing the cross-sectional area of the flues whilst maintaining the same heating surface on the still ?

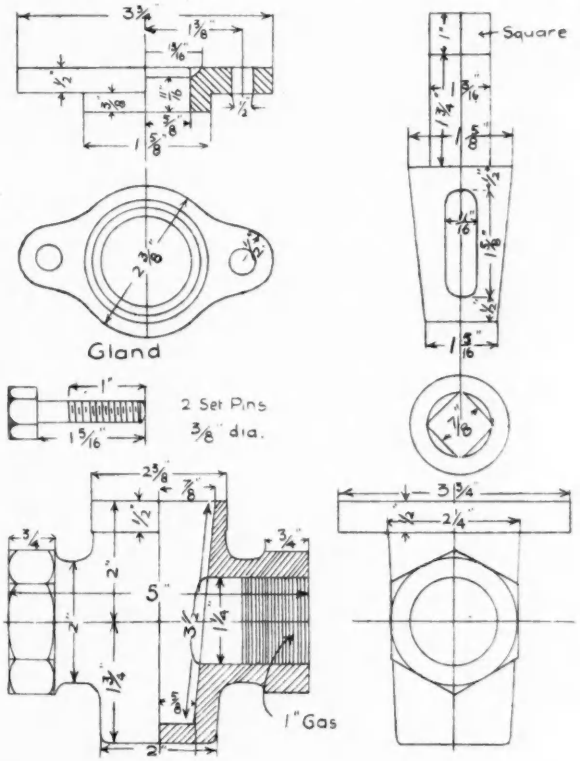
**Drawing**

SECTION F.

*Friday, July 12, 2 p.m. to 6 p.m.*

*Four hours are allowed for this paper. Drawings must be made on the paper provided and each sheet must be signed by the candidate.*

Draw to scale a plan, elevation and end elevation of the assembled Gland Cock, of which the following are detailed views. Make one half of the elevation in section. All views must be properly projected.




## Safeguarding for Chemicals

### Statement for Brotherton and Co.

MR. CHARLES RATCLIFFE, managing director of Brotherton and Co., Leeds (in a statement to the *Yorkshire Post*), quoted the chemical industry as another example of one put on its feet by Safeguarding. Before the war Germany held the field in the chemical and dyeing industries, and it was with the object of placing this country in an independent position that duties were applied in 1919. Under this form of protection the industry has progressed tremendously. Mr. Ratcliffe said the output of his firm's Mersey works had increased six-fold. With an assured home market the industry had been able to establish itself and steadily the price of the product had decreased.

### Prices Reduced

What cost four shillings in 1919 to-day costs one shilling. The general reduction of the price level has had something to do with this, but the increased output, combined with improved efficiency, has contributed largely to the reduction.

In the beginning of 1927 the company introduced an efficiency bonus. This is based on savings arising from the efficient use of raw materials, fuel, power and labour. The year 1926 was taken as the standard, and all subsequent savings due to reduced costs are put into a pool and the amount is divided into three parts :—The employees' share ; the firm's share ; the customers' share in the way of reduced prices.

The employee receives his share as a percentage of actual earnings. The highest rate so far earned has been at the Mersey Chemical Works, Bromborough, Cheshire, where it has reached 3s. in the pound. The total paid out by the firm to the whole of their employees during the twelve months ended March 31, 1929, was £6,317.

In the experience of Brotherton and Co., the results of Safeguarding have been :

(1) The output of their works has been increased to a figure six times greater than it was when Safeguarding was introduced.

(2) The earnings of all employees have been increased.

(3) The selling price has been reduced to one-quarter of the figure ruling prior to the introduction of Safeguarding.

The efficiency bonus scheme has undoubtedly tended to increase the spirit of co-operation between the firm and its employees. It has fostered the team spirit and has encouraged enterprise.

### Sulphuric Acid in Holland

THE DUTCH SULPHURIC ACID INDUSTRY has undergone much development, present production having reached 200,000 tons per annum. Apart from superphosphate factories, there are three independent sulphuric acid factories in Holland, of which one uses zinc blende and the others pyrites.

## Thermometers and Pressure Gauges

THERMOMETERS can be divided into two classes, one where the temperature does not exceed 550° C., and the other for temperatures above 550° C. up to 1,670° C. For temperatures below 550° C., though in many processes mercury-in-glass thermometers are utilised, yet by reason of the many advantages the mercury-in-steel thermometer possesses, this type of instrument is now largely employed. The mercury-in-steel thermometer, owing to its construction, is much more robust than the mercury-in-glass instrument, and though the first costs are higher, yet this is more than balanced by the increased length of life. With the mercury-in-steel instrument the reading is much clearer, owing to the fact that a pointer and a dial are utilised instead of a mercury column. When required, the distance type of instrument can be installed so that the indicator can be brought down and fitted in a position away from the bulb where it can be more easily read; further, frequently several indicators are mounted on a board in some central position in order to bring the temperatures under better supervision. With the mercury-in-steel thermometer a recorder can be fitted in place of the indicator, so that a written record is obtained of the temperature throughout the entire process, which is especially valuable, not only for record purposes, but also as showing exactly what takes place during the night or during the absence of the responsible person. When dealing with liquids, which might affect the steel bulb, the thermometer may be fitted in a protecting pocket of Monel metal, Staybrite steel, wrought iron, lead, etc., or the bulb itself may be coated with lead, tin, silver, nickel, etc. In the case of the distance type of mercury-in-steel thermometer, in order that the varying temperatures round the connecting tubing shall not affect the accuracy of the reading, the tubing is compensated so that it is not affected by any temperature changes. These instruments (which are manufactured by Negretti and Zambra, of 38, Holborn Viaduct, London) are largely employed in chemical works, tar distilleries, sulphate of ammonia plants, soap works, petroleum refineries, varnish works, acid plants, etc., as well as in power plant for flue gases, boiler feed, steam and economiser temperatures, etc.

FIG. 1.—THERMO-ELECTRIC PYROMETER, DIPPING TYPE.

For temperatures above 550° C. and up to 1,470° C., the thermo-electric pyrometer is employed. In this instrument two dissimilar metals are utilised in the thermo-couple or bulb fitting and the current generated when the thermo-couple is heated is measured on an indicator or recorder, which is connected to the thermo-couple by means of a twin wire cable. The thermo-couples themselves may be mounted in protecting sheaths suitable for corrosive liquids or gases, in the same way as the mercury-in-steel thermometers. This instrument is made in a variety of forms. For example, Fig. 1 shows the type with a long rigid stem to be used as a dipping thermometer.

Among the numerous other products of Negretti and Zambra may also be mentioned instruments for the measurement of pressure. These are usually constructed on two different principles. For small pressures or suctions up to 10 lb. per square inch a diaphragm type of movement is employed and for pressures above 10 lb. up to 2,000 lb. a Bourdon tube movement is fitted. Both the types are made with recording mechanism in place of a dial, where a written record is required of the processes. When dealing with instruments for industrial and engineering chemistry, it is frequently of the greatest importance that the case should be as moisture-proof as possible, on account of the fumes which are present and which would be injurious to the mechanism. Special attention is paid to this point with all the instruments described in this article, and the cases themselves are heavly enamelled and stoved so as to prevent corrosion.

## Portable Belt Conveyors

THE transport of bulky material such as coke, coal, sand, gravel, ore, cereals and miscellaneous packages over short distances is most easily effected by portable belt conveyors. Such conveyors can be used for loading and unloading wagons and trucks, for stacking, etc. A running belt gives a much

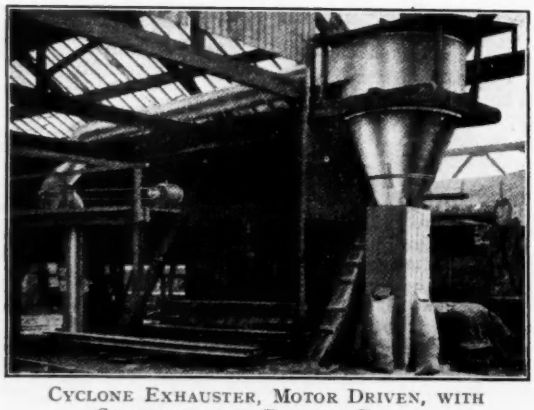
A PORTABLE BELT CONVEYOR.

higher capacity than hand labour; for example, one belt conveyor with two men does in 10 minutes the same amount of work as five men do in one hour. Conveyors of this type are among the numerous manufactures of Bamag-Meguin (Great Britain), Ltd., of Broadway Buildings, Westminster, London. The conveyors are easily moved from one place to another, and their low capital cost is quickly repaid by the great saving in handling and demurrage charges. The Bamag-Meguin conveyor consists of a trough-shaped rubber belt, moving in a trough-shaped bent plate girder (the latter can be moved up and down through a very wide angle by a simple and easily-operated hoist supported on the two large travelling wheels), and the necessary driving mechanism. All rollers are equipped with ball bearings.

The conveyor is driven by a motor, or, in special cases, by an oil engine; if electrically driven the conveyor is equipped either with enclosed type (international patents) or open type driving gear. The motor and drive of the enclosed type are arranged in the upper drum and are of dust-tight construction. The motor of the open type transmits its power by belt and chain to the upper drum. To start the conveyor it is only necessary to plug in the power connection.

## Dust Collection, Ventilation, etc.

THE experience of the last few generations has shown the importance of keeping factories and workshops free from dust



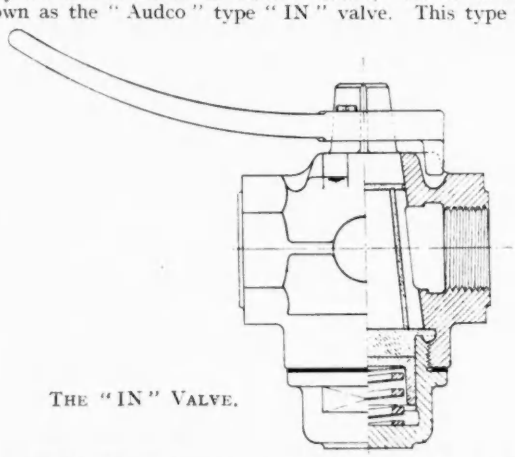
CYCLONE EXHAUSTER, MOTOR DRIVEN, WITH SEPARATOR AND BAGGING DEVICE.

and refuse in order to protect the health of the workers. Matthews and Yates, Ltd., of Cyclone Works, Swinton, Manchester, have developed and perfected the Cyclone localised system of dust and refuse collection. The main features of the plant, as applied, for example, to woodworking machinery, are the Cyclone exhauster and the Cyclone separator, which work in conjunction and are connected by means of trunking, their respective duties being to draw the refuse from the machines as it is made and to deposit it in some convenient place. A typical installation is shown in the illustration. It is hardly necessary to say that the Cyclone system of dust collection has obvious application to the ventilation of works of all kinds.

In addition, reference may be made to the Cyclone systems of humidification and ventilation and of steam removal, to the Cyclone autogenous welding and cutting plant, and to the Cyclone patent continuous progressive system of drying, all of which, among others, have been developed by Matthews and Yates, Ltd. They also specialise in the design, construction and application of fans for every conceivable purpose.

## Lubricated Plug Valves

LUBRICATED plug valves of numerous types are manufactured by the Audley Engineering Co., Ltd., of Newport, Shropshire. They are known under the name "Audco," the latest being known as the "Audco" type "IN" valve. This type was



THE "IN" VALVE.

originally developed for compressed air service, upon which it has been proved to meet the most exacting requirements. It embodies the feature of lubrication now well known in other types of "Audco" valves, and, in addition, has the characteristics of the other types, viz.:—(1) Freedom from leakage; (2) long useful life; and (3) ease of operation. The type "IN" does not require any attention to ensure effective lubrication, and further, there is no provision for adjustments, the injudicious use of which may adversely affect the performance of the valves. The type "IN" augments the range of "Audco" designs, and offers advantages for certain services falling into the general category of clean, non-corrosive gases and liquids, at pressures not exceeding 100 lbs. per sq. in., and at temperatures up to 125° F. or 51° C. The constructional features are disclosed in the accompanying diagram. The spring-loaded piston unit maintains pressure on the lubricant contained between the piston and the plug, and also serves to retain the plug upon its seating in the body. The plug is not in metallic contact with any part of the valve, except the handle.

## Kraft Sacks

OF new methods of packing, nothing is coming to the front more than sacks made of paper and similar materials. Among the firms manufacturing this type of container is Kraft Sacks Co., Ltd., of Welton, Midsomer Norton. The company specialises in the manufacture of sacks made of pure kraft. It has also protected a valve sack—quite a new departure from the usual type of self-closing containers. This sack has an inlet valve for the material and an outlet valve for the air displaced. This valve sack has stood up to the most exhaustive tests.

## The Muspratts and Liverpool

### Sir Max on a Family Connection

IN an article in the *Liverpool Daily Post*, entitled "What I owe to Liverpool," Sir Max Muspratt says: "My grandfather established the first alkali works in this country in 1823, at Vauxhall Road. For many years he lived at Pembroke Place, where my father was born, so, though I was actually born at Seaforth, I can claim I am a 'Dicky Sam' by descent. The aristocrats of those days living on Everton Brow did not like the chemical works in Vauxhall Road—I do not blame them—and my grandfather had to seek pastures new for the most important processes.

"His first attempt was too pastoral, as at Newton the agricultural community did not like having their crops ruined, and it was finally only on the marshes at Widnes that he found his industrial home. But neither my grandfather, my father, nor myself, ever lost a deep-seated love of Liverpool. Indeed, I felt myself so absorbed in Liverpool that my first inclination is to reply that I owe everything to Liverpool, but this would be more effusive than accurate.

"I owe much to Clifton College, to Zurich where I learnt my chemistry, and, even more important, met Lady Muspratt, and Widnes has done so much for my family and myself that my allegiance would be divided, if interests clashed, which they rarely, if ever, do. But what I do owe to Liverpool is constant interest in life, over a long term of years, not unmixed with amusement, which is never cynical.

"I have had many good offers, financially or otherwise attractive, to go to London, but Liverpool holds me by the debts I owe her far too greatly to consider migration, until I die or retire at a date already fixed to a quiet life in the country."

### Research on Fire Extinction

WHEN the Institution of Fire Engineers met in Bristol last year the opinion was expressed that it might be desirable to establish a chair of research in scientific fire extinction at the University of Bristol. The question was again raised at this year's meeting, which took place at Manchester recently. Alderman P. E. Gane, chairman of the Bristol Fire Brigade Sub-committee and a member of the Court of the Bristol University, now wrote to say that he had discussed this matter with representatives of Bristol University, and had been informed that the establishment of a chair for the continuous study of the subject—assuming that continuous study was necessary—would involve a large initial outlay, probably about £20,000. The alternative course would be to engage the services, for a period of not less than five years, of a fully qualified professor and a junior assistant who would devote their time to research work and have the resources of the University at their disposal. The annual cost of this undertaking would be about £1,000. Alderman Gane, in his letter, added that the subject of reducing losses by fire was one in which insurance companies had a close interest. Insurance companies might have considered the idea of supporting university research, but as to this he had no knowledge. He suggested, therefore, that the Council of the Institution might ascertain the views of insurance companies on the subject, and might also consult bodies like the British Fire Prevention Committee.

### "Developments at Avonmouth"

IMPORTANT CHEMICAL DEVELOPMENTS at Avonmouth were mentioned in the course of a housing debate by the Bristol City Council last week. The National Smelting Factory there is likely to develop into a new industry. Already seven or eight hundred men are employed, a number of "key men" having been introduced from South Wales for training purposes. It is hoped that the two furnaces now running may be increased to sixteen, which will mean a big advance in the pay roll and an important addition to the trade of the port. In the course of the debate Alderman Sir Ernest Cook recalled the fact that zinc was first treated in this country and almost in the world, at Crew's Hole, Bristol. At Avonmouth, he said, there was something new of great interest to the city and scientific manufacturers the world over, because a special method of making sulphuric acid—evolved by Peregrine Pickle, of Bristol, but not employed on a large scale hitherto—had been adopted there. In the present instance there was a new development regarding the production of zinc in the treatment of calcined ore. The Council adopted a scheme involving the bulding of 223 houses at an estimated cost of £105,860, to which the firm is making a contribution equal to £13,000.

## Report of Inspectors of Explosives

### Notes on Dyeworks Explosion

THE report of H.M. Inspectors of Explosives for the year 1928 has just been issued (H.M. Stationery Office, pp. 51, 1s.). Among the matters discussed in the report is the accident which occurred at Messrs. Brotherton's Works, Bromborough, Cheshire, on November 11, 1928, whereby two men died from burns and one was injured. The report states that a wet dye had been placed in aluminium trays and dried in a vacuum stove, and after it had cooled a man was extracting a tray by means of an iron hook when it stuck, and on applying extra pressure the tray was released and an explosion occurred. The back of the drier was fractured, suggesting a localised detonation, and two of the steam-heated shelves were displaced. The remaining dye caught fire and three men were injured by burns. Some of the windows on the opposite side of the building were blown out and also a skylight overhead. An Inspector of Explosives inquired into this accident, and also attended the inquest, as it was thought that the dye might possess explosive properties.

A large number of samples were taken for examination and the investigation into the possible causes of the explosion was directed along three lines of enquiry :—(*a*) Examination of the explosive properties of the dyestuff ; (*b*) Examination of the intermediate compounds formed during the manufacture of the dye ; and (*c*) Examination of corrosion products which might be present in the finished dyestuff or on the shelves of the drier.

### Results of Investigation

The results of the investigation were as follows :—

(*a*) The dry dye does not possess dangerous explosive properties, although it is somewhat inflammable.

(*b*) Sensitive products may be formed by the interaction of the dye with metals, metallic oxides and other substances such as sodium carbonate, and it is desirable that the stove should be kept clean and free from such corrosive products. The product formed by the interaction of the dye with aluminium was found, however, to be insensitive.

(*c*) One of the intermediate products, 4:6-Dinitrophenol-diazo-oxide, is a very sensitive and violent explosive and extreme care should be taken that this substance is entirely converted into dye. The presence of unconverted diazo-oxide would account for the accident and would explain the violent effects produced. The fact that explosions have occurred during grinding of the finished dye appears, taking into consideration the properties of the "pure dye," to prove that some of the intermediate product does get into the finished dye.

As this intermediate product remains sensitive even when wet, it is suggested that suitable precautions should be taken in connection with the diazotising and coupling vats, which should include the following :—(1) Care should be taken that none of the diazo product adheres to the sides of the vat above the level of the liquid and becomes dry ; (2) The greatest care should be taken to make it impossible for the wooden paddle to touch the side of the vat ; (3) The bearings, especially the lower one, should be so arranged that no solid matter can get into them ; and (4) The lead draw-off tube and gun-metal stop cock should preferably be replaced with a rubber draw-off tube and rubber bung.

### Non-Inflammable Clothing

At the time of the inquest only one man had died as a result of the burns which he sustained, but the medical evidence which was given indicated that it was unlikely that this man would have died from the injury to his face which he received from the explosion, but that the extensive burns sustained due to his clothing catching fire was the cause of death, and this suggests that the wearing of non-inflammable clothing, as used in explosive factories, might be employed with advantage in operations of this kind.

In order to prevent similar occurrences in the future it would be well if manufacturers engaged in the production of diazo compounds, or in processes involving the formation of diazo compounds, would investigate the nature of the intermediate compounds formed in the processes, and it is for this reason that the results of the investigation have been included at some length in the report for this year.

## Chemical Notes from Westminster

### Questions in the House

LIEUT.-COL. HENEAGE (House of Commons, July 17) asked the Under-Secretary of State for the Colonies what was the present position of the Dead Sea concessions ; and if he proposed to take any action in view of the importance of potash to the agricultural community of Great Britain ?

Mr. Lunn replied that a preliminary agreement with the concessionaires was signed on May 22 substantially in the terms of the draft laid before the House by the late Government on May 8 last in Command Paper No. 3,326. The other document printed in the Command Paper, namely, the "Heads of Agreement" for a draft concession, had not yet been put into the form of a final concession, but it was binding in its substance on the Governments of Palestine and Trans-Jordan. Provision had been made in the Concession to prohibit the operating company from entering into any arrangement for the restriction of output without the previous written consents of the Palestine and Trans-Jordan Governments.

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In the House of Commons (July 18) Brigadier-General Clifton Brown asked the Prime Minister whether, in view of the rejection by the Preparatory Disarmament Commission of the proposal to interdict the dropping of bombs from aircraft, work on chemical warfare would still continue to be explored by our defence organisations

Mr. J. Ramsay MacDonald said that he would point out that, although the Preparatory Disarmament Commission was unable to accept the proposal for the total abolition of bombing from the air, it did agree to accept a clause forbidding, subject to reciprocity, the use of poison and other gases. In these circumstances, he had nothing to add to his reply to a previous question by the hon. and gallant Member on July 9.

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In reply to a question by Mr. Morley (House of Commons, July 23), asking the Secretary for Mines whether he would consider the advisability of erecting and utilising under Government ownership plant for the carbonisation of coal, Mr. Turner said that the whole question of the coal-mining industry was receiving careful consideration.

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The Secretary of State for War, replying to a question by Brigadier-General Clifton Brown (House of Commons, July 23) as to whether the War Office had ceased all work on chemical warfare, said that H.M. Government had declared their intention of ratifying the Geneva Gas Protocol at an early date. In the meantime no change has been made by a departure from the research work which had been for a long time in progress. He understood that similar research work was being carried on in America, Germany, Italy, France and Russia.

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### Salters' Institute Awards for 1929-30

THE following awards for the year 1929–30 have been made by the Salters' Institute of Industrial Chemistry and approved by the Court of the Salters' Company :—

Fellowships have been renewed to Mr. C. G. Akhurst, of the Imperial College, London (Fellow 1927–29), for a further year at the Imperial College of Tropical Agriculture, Trinidad ; Mr. H. K. Cameron, of University College, London (Fellow 1928–29 at the University of Munich), for one year ; Mr. H. Diamond, of University College, London (Fellow 1928–29 at the University of Munich), for one year ; Mr. F. L. Gilbert, of University College, Nottingham and Cambridge (Fellow 1928–29 at Cambridge), for one year ; and Mr. C. H. Lea, of Liverpool University (Fellow 1928–29 at Cambridge), for a further year at the Low Temperature Station, Cambridge.

Fellowships have also been awarded to Mr. C. G. Eltenton, of Trinity College, Cambridge ; Mr. D. L. Hodge, of Imperial College, London ; and Mr. L. C. Bannister, of Liverpool University and Cambridge.

The Salters' Institute has also awarded one hundred grants-in-aid to young men and women employed in chemical works to facilitate their further studies.

# From Week to Week

FATAL INDUSTRIAL ACCIDENTS reported during June included four in chemical factories.

DISEASES OF OCCUPATIONS in Great Britain and Northern Ireland reported during June included four cases of aniline poisoning and four cases of chrome ulceration (two in dyeing and finishing, and one in chrome tanning).

LORD MELCHETT has been elected chairman of the council of the British Empire Producers' Organisation, which for many years has endeavoured to link together various manufacturers and producers of foods and raw materials in many parts of the Empire.

MR. PATRICK J. R. BUTLER, of Bebington, Cheshire, has been appointed to the staff of the patent office at Synthetic Ammonia and Nitrates, Ltd., Billingham. Mr. Butler is at present finishing a year's original research work at Liverpool University, where he graduated B.Sc. with honours.

REPRESENTATIVES OF I.C.I. are (according to German reports) investigating the nature of the fertilisers required in Turkey. Experimental plots are (according to the same source) being laid out in various Turkish provinces, especially in the neighbourhood of Smyrna, and a special laboratory is being built in Constantinople for the purpose of soil analysis.

"COALITE" radiant smokeless coal, produced by Low Temperature Carbonisation, Ltd., has been awarded the Rogers Field gold medal at the Public Health Exhibition and Congress of the Royal Sanitary Institute at Sheffield. The medal is the highest award of the Institute, and is only given for a product of pre-eminent merit from the point of view of national hygiene.

AN EXPLOSION and fire occurred on Wednesday at the Linde oxygen works at Borsigwalde, Germany. The cause of the trouble was the accidental ignition of an acetylene plant. The fire was got under in about two hours, but during that time much damage was done to surrounding buildings by gas cylinders which were hurled about. Though about 1,000 people are employed at the works, only about a dozen were injured, four seriously.

HALLER AND PHILLIPS, LTD., 69, Bishopsgate, London, E.C2, announce that, in consequence of an arrangement between the respectives sales departments of the Purit and Norit Activated Carbons, both products will in future be sold through the N. V. Norit Vereeniging Verkoop Centrale, den Texstreat 2, Amsterdam, for whom the sole representation for the United Kingdom, as from July 1, is entrusted to Haller and Phillips, Ltd., to whom all inquiries for these carbons are now to be sent.

PLANS are under consideration for the erection in Scotland England and Wales of a number of plants to operate the Dvorkovitz process of low temperature carbonisation. One of the Scottish installations will probably be at a coalfield near Glasgow, and another at Lochgelly in Fife. Arrangements are already completed for the erection of plants near Nottingham and at the Heiros coal mine in South Wales, while larger developments are contemplated after a period of continuous working with a new retort now nearing completion.

A MEMORIAL TABLET to Sir Humphry Davy, the eminent British chemist, was unveiled in the Pump Room of the Wirer Endowment, at Ischl, on Saturday morning, in the presence of Dr. Streeruwitz, the Austrian Chancellor, and a party of distinguished guests, including the Secretary of the British Legation in Vienna. Sir Humphry Davy spent several weeks at the Austrian watering place in the twenties of the last century. The Chancellor, in a short speech, dwelt on the gratitude the world owes to the inventor of the Davy safety lamp, by which the lives of innumerable miners of all nations have been saved.

THE STAVELEY COAL AND IRON CO. have completed considerable extensions of their chemical plant, the additional area covered being 9,000 square yards. Facilities for the production of soda and chlorine are increased, and in addition the manufacture of pure hydrochloric acid and liquid chlorine has been commenced. It was decided some time ago to put the scheme into operation in order to utilise current generated from the large gas engines which are fed with waste gases from the blast furnaces. The engines, which are the largest in the country, will now be given a more uniform load, and will be using gas which was being wasted. There is a set of three gas engines, each of 7,000 horse-power.

A MOVE against the Battersea power station scheme is proposed by the Law and Parliamentary Committee of the Westminster Council. They recommend that the Chelsea and Kensington Councils—which took part in the conference held in April last—be now invited to join in the promotion of a private bill: (1) To revoke the consent given by the Electricity Commissioners to the erection of the station; and (2) To prevent the Electricity Commissioners giving consent to the erection of any further super-electricity stations or the extension on a large scale of existing generating stations within the county of London. The objections to the erection of the station have arisen from a fear that the smoke, dust and sulphur fumes evolved may constitute a nuisance.

THE COMMERCIAL SOLVENTS CORPORATION has erected a new factory for the production of butyl acetate at Peoria, Illinois.

A CHEMICAL EXHIBITION will take place in Prague in the period September 1-8. Numerous Czecho-Slovakian manufacturers will participate.

THOMAS TYRER AND CO., LTD., announce that their works and warehouses will be practically closed on Friday, July 26, until Tuesday morning, August 6, for the annual holidays.

UNIVERSITY NEWS.—*Leeds*—The following appointments have been made:—Mr. W. H. Blackburn, Leeds, and Mr. A. R. Kelly, London, as research assistants in the Department of Coal Gas and Fuel Industries; Mr. J. M. Lane, Leeds, as research assistant in dyeing.

MR. ARTHUR BAKER, F.I.C., M.I.Chem.E., joint managing director of Bowater's Paper Mills, Ltd., is one of the directors of Bowater's Mersey Paper Mills, Ltd., which this week invited subscriptions for an issue of £650,000 6½ per cent. first mortgage debenture stock at £96 per cent.

THE OUGREE STEEL TRADING CO., LTD., Stone House, Bishopsgate, London, E.C.2, have been appointed sole agents for the United Kingdom and Colonies, for the sale of "Fuval" putty, manufactured by Fumiere and Devalkeneer, Rue Mouligneau Forchies la Marche, Charleroi, Belgium.

FUEL INDUSTRIES, LTD., and four coal companies in New Zealand have entered into a contract for the carbonisation of their coal by a new company with a capital of £100,000. A contract, it is announced, has been let for two carbonising, tar distilling and briquetting plants capable of treating fifty tons a day.

UNEMPLOYED INSURED PERSONS at June 24 in the industry of chemical manufacture in Great Britain and Northern Ireland numbered 6,455 (males 5,671, females 783); in explosives manufacture, 730 (males 529, females 201); in paint, varnish, japan, red and white lead manufacture, 758 (males 620, females 138); and in oil, grease, glue, soap, ink, etc., manufacture, 5,810 (males 4,963, females 847). The percentages of insured persons in the same industries unemployed at the same date were 6·4, 3·6, 4·1, and 7·6 respectively.

THE ELECTROLYTIC ZINC CO. of Australasia has acquired a one-fourth interest in Australian Fertilisers Proprietary, which, in addition to its works at Port Kembla, N.S.W., has substantial interests in A.C.F. and Shirleys Fertiliser, Queensland. Other shareholders in Australian Fertilisers Proprietary are the Mt. Lyell Mining and Railway Co., Cumin Smith and Co. Proprietary, and Imperial Chemical Industries (Australasia). It is anticipated that the linking up of these important concerns will materially advance the further development of the fertilser industry in Australia.

IN THE COURT OF SESSION, on Saturday, July 20, Lord Murray gave judgment in the petition of Robert Maclaurin, Homesteads, Cambusbarron, Stirlingshire, and Maclaurin Carbonisation, Ltd., 142, St. Vincent Street, Glasgow, for the extension of a patent presented under the provisions of the Patents Act, 1907, as amended by the Act of 1919. The petitioners were the patentee and a limited company promoted by him, and the sole compearing respondent was the Comptroller-General in the discharge of his duty to protect the public interest. The patent in question was due to expire on October 28 next. Lord Murray extended the patent for a period of seven years as from that date.

AN EXPLOSION from a water-tube boiler at the West Works of the Salt Union, Ltd., Winsford, Cheshire, forms the subject of a report just issued under the Boiler Explosion Acts. The explosion occurred on October 9, 1928, one man being injured. The cause of the explosion is given as overheating of a tube. The report states that the arrangements made for opening up the boilers periodically for cleaning and inspection appear to have been satisfactory, but the form of the tubes was such as to prevent a visual examination of the interior surfaces being made to ascertain whether each tube was thoroughly clear of scale after cleaning operations. The loose scale which was found in the front lower drum may have retarded the circulation of water in the tubes and seems to indicate that the measures taken to clean the tubes may not have been wholly effective or that the boiler feed water was not as pure as is desirable with boilers of this type.

THE CELLULOSE ACETATE SILK CO. has issued a report covering the period January 26, 1928 (the date of incorporation) to March 31, 1929. The report states that as a result of unavoidable delays it was not found possible to arrange for the installation of the plant and machinery within the time estimated in the prospectus, but the board consider the delay in no way prejudicial to the future of the company, as it was considered essential that the various processes should be fully tried out on the experimental plant before orders for machinery were placed. The first unit of the acetate plant is now complete, and is capable of an output of over four tons per day. The report adds that a contract has been entered into recently for the sale of acetate at satisfactory prices, extending over a period of years, in quantities rising from 2½ tons per day by December 31 next, and deliveries have already commenced. The first unit of the spinning plant will be completed in September.

# References to Current Literature

## British

ANALYSIS.—Some analytical applications of sodium hydrosulphite. (Antimony, bismuth, lead, cadmium.) B. S. Evans. *Analyst*, July, pp. 395–405.

The volumetric determination of mercury. H. B. Dunnicliff and H. D. Suri. *Analyst*, July, pp. 405–410.

BUTTER.—The Kreis test as a method for the detecton of incipient rancidity in cacao butter. T. H. Cooke. *Analyst*, July, pp. 411–413.

Dyes as an indication of adulteration in butter. D. Henville and W. M. Paulley. *Analyst*, July, p. 413.

GENERAL.—Furfural and diastase in heated honey. L. H. Lampitt, E. B. Hughes and H. S. Rooke. *Analyst*, July, pp. 381–395.

The influence of hydrogen ion concentration on the adsorption of weak electrolytus by pure charcoals. H. J. Phelps and R. A. Peters. *Proc. Roy. Soc. A*, July 1, pp. 554–568.

SMOKES.—The process of coagulation in smokes. H. S. Patterson, R. Whytlaw-Gray, and W. Cawood. *Proc. Roy. Soc. A.*, July 1, pp. 502–522.

The structure and electrification of smoke particles. H. S. Patterson, R. Whytlaw-Gray and W. Cawood. *Proc. Roy. Soc. A.*, July 1, pp. 523–532.

## United States

ANALYSIS.—Methods for cottonseed analysis. G. S. Jamieson and R. S. McKinney. *Oil and Fat Industries*, July, pp. 11–13.

Iodine values on Menhaden fish oil. C. H. Bankes and A. R. Lange. *Oil and Fat Industries*. July, pp. 31–33.

A new qualitative reagent for sodium. E. R. Caley. *J. Amer. Chem. Soc.*, July, pp. 1965–1969. The reagent consists of a solution of uranyl and cobalt acetates in normal acetic acid.

APPARATUS.—A stopcock in which contamination by grease is prevented, and its application to a problem in gas technique. H. C. Ramsperger. *J. Amer. Chem. Soc.*, July, pp. 2132–2134.

GENERAL.—The fatty acids associated with rice starch. L. Lehrmann. *J. Amer. Chem. Soc.*, July, pp. 2185–2188. Hydrolysed rice starch contains palmitic, oleic and linolic acids.

GOSSYPOL.—Studies on gossypol. A progress report. E. P. Clark. *Oil and Fat Industries*, July, pp. 15–19.

INDUSTRIAL RESEARCH.—Structure of an industrial research association. C. M. A. Stine. Two examples of smaller industrial research organisations. W. Platt. *Ind. Eng. Chem.*, July, pp. 657–659, 659–661.

MECHANICAL HANDLING.—Mechanical handling of materials in and about the chemical plant. II. Belt conveyors. A. K. Burditt and W. F. Schaphorst. *Ind. Eng. Chem.*, July, pp. 649–654.

OIL REFINING.—The refining of light oil with silica gel at Rochester, N.Y. R. E. Fulreader. *Ind. Eng. Chem.*, July, pp. 691–693.

SOLVENTS.—1 : 4-Dioxan. E. W. Reid and H. E. Hofmann. *Ind. Eng. Chem.*, July, pp. 695–697. 1 : 4-Dioxan (diethylene dioxide) is now available in the United States on the semi-commercial scale. It has m.p. 11°C. and b.p. 101·1° C., and its solvent properties seem to promise important fields of application.

## German

ACTIVE CHARCOAL.—The activation of charcoal by means of steam. P. P. Kosakewitsch and N. A. Ismailow. *Kolloid-Zeitschrift*, July, pp. 241–246.

ANALYSIS.—The analysis of organic mixtures. E. Benesch. *Chemiker-Zeitung*, July 20, pp. 566–567.

The gravimetric determination of manganese as manganic salt by a new method. R. Lang and F. Kurtz. *Zeitschrift analytische Chem.*, Vol. 181, Parts 1–2, pp. 111–120.

The determination of small quantities of potassium in the presence of much sodium salt by a direct, gas-volumetric method. G. Jander and H. Faber. *Zeitschrift anorganische Chem.*, Vol. 181, Parts 1–2, pp. 189–192.

APPARATUS.—A pyknometer for the determination of the density of thick liquids. E. H. Riesenfeld and T. Hamburger. *Chemiker-Zeitung*, July 13, p. 547.

EXPLOSIVES.—Pentaerythrite tetranitrate and its mixture with nitroglycerin (" Penthrinit ") as fillers for projectiles. I. and II. A. Stettbacher. *Chemiker-Zeitung*, July 10, pp. 533–534 ; July 17, pp. 554–556.

GAS.—Combustion and explosion processes. F. Haber. *Zeitschrift angewandte Chem.*, July 20, pp. 745–751.

The development of the illuminating gas industry from the chemical standpoint. W. Bertelsmann. *Zeitschrift angewandte Chem.*, July 20, pp. 753–757.

Contribution to the knowledge of coke oven gas. P. Schuftan. *Zeitschrift angewandte Chem.*, July 20, pp. 757–760.

The separation of the components of coke oven gas and their utilisation. J. Bronn. *Zeitschrift angewandte Chem.*, July 20, pp. 760–768.

The removal of sulphur from gases, and methods of rendering it available. Remarks on the present position of the problem. G. Lorenzen. *Zeitschrift angewandte Chem.*, July 20, pp. 768–773.

Gas from lignite. F. Frank. *Zeitschrift angewandte Chem.*, July 20, pp. 773–776.

GENERAL.—New methods of liquefying chlorine by patent chlorine compressors. *Chemiker-Zeitung*, July 17, p. 556.

The rapid absorption of hydrogen by permanganate solutions containing silver. F. Hein and W. Daniel. *Zeitschrift anorganische Chem.*, Vol. 181, Parts 1–2, pp. 78–82.

The absorption of hydrogen by calcium and its alloys. G. Kassner and B. Stempel. *Zeitschrift anorganische Chem.*, Vol. 181, Parts 1–2, pp. 83–94.

The action of carbon dioxide under high pressure on metallic iron. E. Müller and H. Henecka. *Zeitschrift anorganische Chem.*, Vol. 181, Parts 1–2, pp. 159–171.

Exchange reactions of insoluble alkaline earth phosphates with permutites and clays. E. Ungerer. *Kolloid-Zeitschrift*, July, pp. 237–241.

ORGANIC.—The reaction of nitrobenzene with secondary alcohols. R. E. Lyons and M. E. Pleasant. *Berichte*, July 10, pp. 1723–1727.

The formation of cumarone in coal tar. N. A. Orlow and M. A. Belopolsky. *Berichte*, July 10, pp. 1752–1754.

A new synthesis of acetoacetic ester and of malonic ester. H. Lux. *Berichte*, July 10, pp. 1824–1827.

RAYON.—The viscosity of viscose. I. The type of change of viscosity of viscose during ripening. G. Kita, S. Iwasaki, S. Masuda and K. Matsupama. *Kolloid-Zeitschrift*, July, pp. 270–276.

## Miscellaneous

ANALYSIS.—The determination of nitric nitrogen by alkaline reduction with aluminium powder. A. Seyewetz. *Bulletin Société Chimique France*, May, pp. 463–465 (in French).

A new identification reaction for hexamethylenetetramine in wines. M. V. Ionescu and C. Bodea. *Bulletin Société Chimique France*, May, pp. 466–468 (in French).

The titration of acetic anhydride in mixtures of ethyl or methyl alcohol and water. J. F. M. Caudri. *Recueil Travaux Chimiques Pays-Bas*, July 15, pp. 778–792 (in English).

GENERAL.—Determination of transition point by the method of vapour pressure. M. Matsui, S. Aguri, S. Kambara and K. Kato. *J. Soc. Chem. Ind. Japan* (supplemental binding), June, pp. 172–174B (in English).

Studies on soap solution. III. Adsorption of soaps on charcoal. J. Mikumo. *J. Soc. Chem. Ind. Japan* (supplemental binding), June, pp. 178–180B (in English).

Investigations on the saponins and related bodies. XXI. Sarsaparilla-saponin and its hydrolysis. The synthetic production of a saponin from parigenin and *d*-glucose. A. W. van der Haar. *Recueil Travaux Chimiques Pays-Bas*, July 15, pp. 726–742 (in German).

GLUE.—The water-resisting property of glue and casein glue I. and II. T. Araki and T. Matsuno. *J. Soc. Chem. Ind. Japan* (supplemental binding), June, pp. 183–184B (in English).

# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

## Abstracts of Complete Specifications

313,864. Acetaldehyde from Acetylene, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 12, 1928.

Acetylene is converted into acetaldehyde by passing it into concentrated aqueous solutions of neutral salts which show an acid reaction, such as chlorides of zinc, chromium, magnesium, or calcium. The gas is passed through a cooler to recover the acetaldehyde, and water is continuously added to maintain the initial concentration. The yield of acetaldehyde can be increased by the addition of small amounts of compounds of the metals of groups 1, 2, 4, 6, and 8, having an atomic weight of the order of mercury and uranium.

313,892. Acidyl Derivatives of Hydroxy-Alkyl Ethers of Polyhydric Alcohols, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 19, 1927.

Hydroxy-alkyl ethers of polyhydric alcohols containing more than two hydroxyl groups or their derivatives and conversion products containing free hydroxyl groups are treated with an acylating agent. The hydroxy-alkyl ethers obtained correspond to the general formula —X—O—R—OH, in which X is the radicle of a polyhydric alcohol, and R is an alkylene radicle. The products are soluble in a large number of organic substances and can be used as softening agents, camphor substitutes, etc. Acidyl derivatives referred to include the esters of monocarboxylic acids such as formic, acetic, or benzoic acid, and the esters of polybasic, carboxylic acids such as oxalic, maleic, succinic and phthalic acids.

313,897. Acetone, Manufacture and Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 16, 1928.

Acetone is obtained by passing a mixture of acetaldehyde and steam at 350°—500° C. over a catalyst consisting of zinc or zinc compounds, together with other metals or metal compounds the acetates of which are decomposed by heat with the formation of acetone. The mixture is passed over the catalyst at such a rate that no decomposition of the acetone occurs. The catalysts may consist of oxides, carbonates, or acetates of zinc, aluminium, or tin. Activators may be added to the catalyst, such as vanadium pentoxide, manganese dioxide, and chromium-thallium compounds. Spent catalysts may be regenerated by heating in a current of moist air. A yield of over 90 per cent. can be obtained.

313,934. Organic Bases, Production of, and Pest Destroying Agents. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 14 and August 25, 1928.

These organic bases are obtained by treating nitrogenous bases such as ammonia or primary or secondary amines with aliphatic hydrocarbons containing more than one double bond, *e.g.*, butadiene and homologues, in the presence of an alkali metal such as sodium or potassium. The alkali metal may be added to the nitrogenous base and the butadiene hydrocarbon then added to the solution. In an example, metallic sodium is dissolved in ammonia and butadiene then added and the mixture kept at —80° C. for some time. Excess of ammonia and butadiene are then distilled off, and the residue dissolved in ether and distilled in vacuo. The product contains 45 per cent. of tributenyl amine and 55 per cent. of a higher boiling base richer in carbon. A similar process is employed with other butadiene hydrocarbon such as isoprene, piperylene, methyl-isoprene, or other bases such as monomethylamine, dimethylamine, piperidine, pyrrolidene, etc. These products can be used for the destrutcion of pests by atomising the aqueous solutions, etc.

313,999. Finely Divided Ferric Oxide, Manufacture of. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 21, 1928. Addition to 298,926.

An aqueous suspension of ferric hydroxide is heated to a temperature above 100° C. and at an increased pressure in the presence of an alkaline acting agent. A solution of a ferric salt may be precipitated with a quantity of a basic compound larger than that required for the conversion of the ferric salt into hydroxide, and the mixture heated to 100°—150° C. Pigments of various shades are obtained, from yellowish-red to dark violet depending on the conditions. The products consist of pure ferric oxide with 1—2 per cent. of combined water.

314,129. Gases containing Carbon Monoxide, Method of Operating with at Elevated Temperatures. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 30, 1927.

Specification No. 231,285 (see The Chemical Age, Vol. XII, p. 438) describes the catalytic reduction of carbon monoxide with hydrogen at high temperature and pressure in an apparatus in which the parts coming into contact with carbon monoxide are made or lined with copper, silver, aluminium, or special steels. This prevents the formation of iron carbonyl which would poison the catalyst, while less refractory metals may be employed for the cooler or cold parts of the apparatus. It is now found that these precautions are not necessary in those parts of the apparatus which are at 350°—500° C. since iron is not attacked at these temperatures, so that special metals need only be employed for those parts of the apparatus which are between 150°—250° C. Carbon monoxide is excluded from the apparatus while heating up and cooling down

314,213. Destructive Hydrogenation of Solid Carbonaceous Material, Process for. A. Rule, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Imperial Chemical House, Millbank, London, S.W.1. Application date, June 22, 1928.

In the usual process for the destructive hydrogenation of coal or lignite, a temperature of 470° C. and pressure of 200 atmospheres is employed. The product usually contains insoluble matter and oil in the proportion of 1: 2—4, but the separation of the solid matter and the recovery of the oil are difficult owing to viscosity. In this invention, a relatively fluid product is obtained in which the proportion of oil to solid matter is 10—20 : 1. This is obtained by the use of pressures above 500 atmospheres and a temperature which must be within 5°—10° of 420° C. The coal or lignite may be mixed with oil or tar before treatment.

314,242. Magnesium Cyanide and Its Compound with Ammonia, Production of. J. Y. Johnson, London. From I.G. Farbenindustire Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 23, 1928. Addition to 300,348.

Magnesium cyanide or the double compound with ammonia are obtained by treating magnesium compounds, dissolved or suspended in ethyl or methyl alcohol, with hydrocyanic acid and ammonia. A precipitate of magnesium cyanide diammoniate is obtained, which when heated in vacuo is converted into magnesium cyanide and ammonia. The magnesium cyanide and diammoniate are adapted for the destruction of pests because hydrocyanic acid is liberated under the action of atmospheric moisture. Examples are given.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: —285,502 (I.G. Farbenindustrie Akt.-Ges.) relating to nitrogenous dyestuffs, see Vol. XVIII, p. 369; 287,479 (I.G. Farbenindustrie Akt.-Ges.) relating to azo dyestuffs, see Vol. XVIII, p. 495; 287,525 (H. Magnus) relating to distillation and cracking of hydrocarbons, see Vol. XVIII, p. 495;

290,192 (I.G. Farbenindustrie Akt.-Ges.) relating to condensation products from urea, thiourea, etc., and an alcohol or ketone, see Vol. XIX, p. 35; 294,100 (C. Epner) relating to liquid polymerisation products from gases containing hydrocarbons, see Vol. XIX, p. 296; 297,839 (E. Glucksmann) relating to salts of halogen substituted aliphatic tetra-ammonium bases, see Vol. XIX, p. 519; 300,248 (Barber Asphalt Co.) relating to a metallic alloy, see Vol. XX, p. 15 (Metallurgical Section).

### International Specifications not yet Accepted

312,043–4. Catalytic Processes. E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. (Assignees of W. A. Lazier, 107, Winston Avenue, Wilmington, Del., U.S.A.) International Convention date, May 18, 1928.

312,043. Catalysts are described for the hydrogenation of aldehydes and ketones to alcohols, and aldehyde alcohols to glycols. The catalyst may be an oxide of beryllium, magnesium, zinc, aluminium, silicon, titanium, germanium, zirconium, tin, cerium, thorium, vanadium, bismuth, chromium, molybdenum, tungsten, uranium, manganese, iron, and rare earths. Dehydrating effects of the catalyst are prevented by adding compounds of the alkali or alkaline earth metals of groups 1 and 2 in the form of oxides, carbonates, hydroxides, or salts with organic acids. An example of such a catalyst is zinc chromite with potassium carbonate.

312,044. Hydrated organic compounds are obtained by treating organic compounds in the presence of oxide catalysts which have a hydrating and dehydrogenating effect. The dehydrating effect is counteracted by adding a repressive agent such as acidic oxides in the form of acids, acid salts, anhydrides and ammonium salts.

The process is applied to the hydrolysis of methyl chloride to methanol, where the repressive agent is added to prevent the formation of dimethyl ether, and to the hydrolysis of dimethyl ether where aluminium sulphate is added to an alumina catalyst to prevent the formation of formaldehyde.

312,069. Indiarubber. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 18, 1928.

Pentamethyl-guanidine and pentabutyl-guanidine are used for accelerating the vulcanisation of rubber.

312,169. Fertilisers. F. Jost, Castroperstrasse, Börnig, Herne, Germany. International Convention date, May 21, 1928. Addition to 306,046.

Specification 306,046 (see The Chemical Age, Vol. XX, p. 411) describes the treatment of calcium phosphate with nitric acid, and the solution with alkali chloride. In this invention, the phosphate, nitric acid and alkali chloride are distilled together. The vapours of hydrochloric and nitric acids are absorbed in ammonia, milk of lime, or soda lye, to produce a non-hygroscopic fertiliser, and the residue of alkali nitrate and calcium phosphate forms a mixed fertiliser. The distillation may be interrupted to obtain an acid residue, which is neutralised with ammonia.

312,173. Acetic Acid. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 18, 1928.

Acetic acid solution is concentrated to 60 per cent., and is then mixed with urea or other amide, *p*-toluidine, or an alkali acetate to form an addition compound. The water is removed by distillation or crystallisation, and the addition compound heated to obtain the acetic acid. The first concentration is effected by cooling to −26° C. with stirring to avoid supercooling, and the ice crystals washed with 20 per cent. acetic acid. The addition compound is separated centrifugally at −17° C., and the acid recovered by heating in vacuo. The urea is then used again.

312,174. Dyes and Intermediates. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, May 19, 1928.

Formaldehyde, with or without a solvent or diluent, is condensed with methylene bases of cyclammonium salts—*e.g.*, a trimethyl-indolenin, to obtain intermediates. The crystalline products are oxidised on exposure to air to red basic dyestuffs.

312,175. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 18, 1928. Addition to 299,721. (See The Chemical Age, Vol. XX, p. 13.)

Halogen sulpho-1 : 8-naphthalic acids or anhydrides are caused to react in aqueous solution with ammonia or an aliphatic or aromatic amine. In an example, 4-chloro- or 4-bromo-naphthalic anhydride is sulphonated to obtain sulpho-4-chloro- or bromo-naphthalic anhydride, which is then condensed with ammonia, *p*-toluidine, or aniline. The products are acid wool dyestuffs.

312,283. Sulphonating Fatty Acids. Naamlooze Vennootschap Chemische Fabriek Servo, and M. D. Rozenbroek, Delden, Twente, Overijsel, Holland. International Convention date, May 23, 1928.

Sulphonation of fatty acids is effected in the presence of salts of acetic acid or homologues or substitution products. The sulphonation mixture may consist of dehydrated sodium acetate and concentrated sulphuric acid, and various substitution products of acetic acid are also mentioned.

312,345. Catalytic Dehydrogenation. E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. (Assignees of W. A. Lazier, 107, Winston Avenue, Wilmington, Del., U.S.A.) International Convention date, May 26, 1928.

The conversion of primary alcohols into esters at high temperature and pressure is effected with a catalyst consisting of copper and one or more difficultly reducible oxides of metals of the second group. The catalyst may be made by melting magnesium oxide 1 part, zinc oxide 4 parts, and cupric oxide 20 parts, crushing and screening the product, and reducing with carbon dioxide and hydrogen. Ethyl alcohol vapour is passed over this catalyst at a pressure of 4,000 lb. per sq. in. and a temperature of 375° C., and a 20 per cent. yield of ethyl acetate is obtained.

312,347. Dyes and Intermediates. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany, and A. Carpmael, London. International Convention date, May 26, 1928. Addition to 297,376. (See The Chemical Age, Vol. XIX, p. 418.)

Isatin α-derivatives having in the 7-position an alkyl group, in the 6-position a halogen atom or an alkyl group, and in the 5-position a halogen atom, are condensed with a hydroxythionaphthene having in the 5-position a halogen atom and in the 7-position hydrogen, halogen, or alkyl. The products are thioindigo dyes of the 2-thionaphthene-2-indol series and examples are given.

Latest Notifications.

315,397. Manufacture of glacial acetic acid from dilute acetic acid. I.G. Farbenindustire Akt.-Ges. July 14, 1928.

315,262 Manufacture of sodium nitrate. Anglo-Chilean Consolidated Nitrate Corporation. July 10, 1928.

315,400. Manufacture of dyestuffs. Soc. of Chemical Industry in Basle. July 13, 1928.

315,263 Process for the preparation of 2 : 3-butylene-glycol from carbohydrates. T. H. Verhave, Sen. July 10, 1928.

315,264. Process for the preparation of acetyl methyl carbinol, and diacetyl. T. H. Verhave, Sen. July 10, 1928.

315,356. Process of polymerizing hydrocarbons of the butadiene series. I.G. Farbenindustrie Akt.-Ges. July 12, 1928.

315,312. Process for the manufacture of condensation products from diolefines and hydrocarbons. I.G. Farbenindustrie Akt.-Ges. July 11, 1928.

315,313. Manufacture of coloured varnish coatings on articles made of glass for use in the glow-lamp industry. I.G. Farbenindustrie Akt.-Ges. July 11, 1928.

315,227. Waterproofing compositions, and articles treated therewith. Imperial Chemical Industries, Ltd. July 9, 1928.

315,275. Manufacture of shaped objects from cellulose derivatives. I.G. Farbenindustrie Akt.-Ges. July 10, 1928.

315,276. Manufacture of dyestuffs. Soc. of Chemical Industry in Basle. July 10, 1928.

315,433. Manufacture of Bz1:Bz1-dibenzanthronyl. Soc. of Chemical Industry in Basle. July 13, 1928.

315,434. Immunizing textiles to direct dyeing dyestuffs. Soc. of Chemical Industry in Basle. July 13, 1928.

315,435. Immunizing vegetable fibres to direct dyeing dyestuffs. Soc. of Chemical Industry in Basle. July 13, 1928.

315,664. Manufacture of metalliferous dyestuffs. Soc. of Chemical Industry in Basle. July 14, 1928.

315,665. Manufacture of metalliferous dyestuffs. Soc. of Chemical Industry in Basle. July 14, 1928.

315,666. Manufacture of esters and amides of 2 : 3-amino-naphthoic acid or its substitution products. I.G. Farbenindustrie Akt.-Ges. July 14, 1928.
315,667. Manufacture of safety glass. I.G. Farbenindustrie Akt.-Ges. July 14, 1928.

### Specifications Accepted with Date of Application

314,819. Decomposition of calcium carbonate and manufacture of calcium carbide. G. Patart and H. Nielsen. December 30, 1927.
314,032. Ferrous molybdenum alloys. Climax Molybdenum Co. November 1, 1927.
314,909. Ureas and thioureas of the naphthalene series. G. M. Dyson and A. Renshaw. February 1, 1928.
293,440. Refining hydrocarbon distillates. Gray Processes Corporation. July 7, 1927.
314,768. Azo dyestuffs. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) March 1, 1928.
287,135 and 294,226. Acetic acid from acetylene. J. Karpati and M. G. Hübsch. March 16 and July 21, 1927.
314,822. Froth flotation. R. J. Lemmon. March 3, 1928.
286,316. Finely distributed or colloidal mixtures of bodies insoluble in one another. M. Polanyi and S. von Bogdandy. March 4, 1927.
314,825. Xanthen dyes. Imperial Chemical Industries, Ltd., E. H. Rodd, and H. H. Stocks. March 3, 1928.
314,826. 3 : 7-Tetra-alkyl-diaminoxanthones. Imperial Chemical Industries, Ltd., E. H. Rodd, and H. H. Stocks. March 3, 1928
287,908. Azo dyestuffs. I.G. Farbenindustrie Akt.-Ges. March 29, 1927.
288,154. Nitrogen and hydrogen. Kali-Industrie Akt.-Ges. and C. T. Thorssell. April 1, 1927.
288,159. Condensation products of the benzodiazine series. I.G. Farbenindustrie Akt.-Ges. March 31, 1927.
288,972. Aromatic N-aminoalcohol-aminoaldehydes and derivatives. I.G. Farbenindustrie Akt.-Ges. Apirl 16, 1927.
288,973. Refining chromium ores. I.G. Farbenindustrie Akt.-Ges. April 16, 1927.
288,628. Hydroxy-pyridine compounds. Schering-Kahlbaum Akt. Ges. April. 14, 1927.
288,215. Vat dyestuffs and intermediates. I.G. Farbenindustrie Akt.-Ges. April 4, 1927.
288,307. Copper amine complex azo compounds. I.G. Farbenindustrie Akt.-Ges. April 6, 1927.
314,932–3. Synthetic rubber. Gosudarstvennyi Trest Rezinovoi Promyshlennosti (Resinotrest) and B. W. Bysow. April 5, 1928.
315,033. Vat dyestuffs. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). April 26, 1928.
297,050. Synthetic rubber. Goodyear Tire and Rubber Co. September 13, 1927.
315,078. Acid sulphate of α-naphthylamine. T. Warburton. June 19, 1928.
315,117. Refining crude paraffin. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 3, 1928.
315,128. Lead oxide. G. B. Price and Quirk, Barton and Co., Ltd. August 16,1928.
315,142. Ballast-free solid fertilisers containing lime. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 14, 1928.
315,151. Barium peroxide. B. Laporte, Ltd., I. E. Weber and V. W. Slater. October 6, 1928.
298,636. Zinc from oxidic zinc compounds. Metalges. Akt.-Ges. October 13, 1927.
300,630. Alkali sulphates. Chemieverfahren Ges. November 18, 1927.
300,271. Working up calcined zirconium-lime products. Kali-Chemie Akt.-Ges. November 11, 1927.

### Applications for Patents

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of poly-halogenated fatty acids. 21,745. July 15.
—— Manufacture of mercury derivatives of butadiene. 22,130. July 18.
—— Manufacture of chromium oxide pigments, etc. 22,292. July 19.
Du Pont de Nemours and Co., E. I., and Triggs, W. W. Azo dyestuffs. 22,140. July 18.
Elektrochemische Ges., and Grohmann, H. Manufacture of calcium nitride. 22,355. July 20.
Fredenhagen, K. Manufacture of fluorine. 21,977, 21,978. July 17. (Germany, July 17, 1928.)
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of artificial articles. 21,719. July 15.
—— Production of vat dyestuffs. 21,720. July 15.
—— Manufacture of olefines. 21,864. July 16. (February 13, 1928.)
—— Apparatus for measurement and conveyance of pulverulent coal, etc., into vessels under pressure. 22,127. July 18.
—— Manufacture of condensation products. 22,128. July 18.
—— Manufacture of resinous products. 22,129. July 18.
—— Manufacture of mercury derivatives of butadiene. 22,130. July 18.
—— Manufacture of vat dyestuffs. 22,275. July 19.
—— Auxiliary agent for use in textile, etc., industry. 22,276. July 19.
—— Manufacture of porous masses. 22,277. July 19.
—— Manufacture of artificial compositions. 22,278. July 19.
—— Manufacture of chromium oxide pigments, etc. 22,292. July 19.
—— Purification of gases by washing. 22,352. July 20.
I.G. Farbenindustrie Akt.-Ges. Treating magnesium alloys. 21,710. July 15. (Germany, April 25.)
—— Production of valuable liquid products from carbonaceous materials. 21,718. July 15. (Germany, July 17, 1928.)
—— Steaming dyed or printed fabrics. 21,733. July 15. (Germany, March 18.)
—— Manufacture of esters and amides of 2 : 3-amino naphthoic acid, etc. 21,735. July 15. (Germany, July 14, 1928.)
—— Dyeing cellulose ethers, etc. 21,746. July 15. (July 10, 1928.)
—— Manufacture of safety glass. 21,751. July 15. (Germany, July 14, 1928.)
—— Sound kinematograph films. 22,265. July 19. (Germany, July 19, 1928.)
—— Illuminating arrangement for kinematograph projectors. 22,266. July 19. (Germany, August 1, 1928.)
Imperial Chemical Industries, Ltd. Destructive hydrogenation. 21,805, 21,806. July 16.
—— Hydrogenation of coal. 22,073. July 18.
—— Method of separating liquids.22,139. July 18.
—— Destructive hydrogenation. 22,205. July 19.
Palazzo, F. Production of mono-calcium phosphate, etc. 22,226. July 19. (Italy, July 30, 1928.)
—— F. C. Production of mono-calcium phosphate, etc. 22,226. July 19. (Italy, July 30, 1928.)
Schering-Kahlbaum Akt.-Ges. Manufacture of menthane. 21,912. July 16. (Germany, June 8.)
Soc. of Chemical Industry in Basle. Manufacture of metalliferous dyestuffs. 21,732, 21,734. July 15. (Switzerland, July 14, 1928.)

## British Metallurgists to Visit Germany

A VERY attractive programme has been drawn up in connection with the Metallurgical Congress that the Institute of Metals is holding in Düsseldorf from September 9–12. The gathering is the first of its kind to be held since the war, and takes place by invitation of the Verein Deutscher Ingenieure and the Deutsche Gesellschaft für Metallkunde. At the two business sections of the congress 14 technical papers will be presented for discussion. Following the meetings, visits will be paid to works in Düsseldorf and neighbourhood, and to the Düsseldorf Foundry Exhibition; there will also be a whole-day excursion to the Krupp works at Essen. On the social side, there will be a dinner and dance given by the Lord Mayor of Düsseldorf, also a cabaret evening at the Düsseldorf Artists' Club. Following the Düsseldorf meeting, supplementary visits will be paid on September 13–15, the first to Berlin and the second to Holland. The latter will be entirely of a sight-seeing character, but in Berlin visits will be paid to works as well as to the Technical High School at Charlottenburg and to the Government Testing Laboratory.

Full details of the gathering can be obtained, together with membership particulars, from the Secretary, Mr. G. Shaw Scott, M.Sc., 36, Victoria Street, S.W.1. The Secretary can also supply full details with regard to combined travel and hotel arrangements to cover the various trips, the minimum rate being the very reasonable one of £8 2s. 6d.

## The Metric System in Corea

H.M. CONSUL-GENERAL at Seoul has informed the Department of Overseas Trade that it is part of the policy of the Government General of Corea to enforce the use of the metric system, and that difficulty may be encountered over the import of instruments based on other systems. He mentions, for instance, that thermometers may henceforth only be imported by special permit, and none except those having centigrade scales may be sold in Corea. These are imported by a department of the Government General, and tested and stamped by this authority, before being passed on to approved dealers, who have to deposit a sum of money with the department as security for the observance of their conditions.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, 2s. 2d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 8d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. Dark, 1s. 6d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6½d. to 6¾d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2¼d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8d.-8¼d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 40s. to 45s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8¼d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8¼d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8¼d. per lb.

*o*-CRESOL 29/31° C.—5¼d. per lb.

*m*-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

*p*-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

*a*-NAPHTHOL.—2s. per lb. d/d.

*B*-NAPHTHOL.—10d. per lb. d/d.

*a*-NAPHTHYLAMINE.—1s. 3d. per lb.

*B*-NAPHTHYLAMINE.—3s. per lb.

*o*-NITRANILINE.—5s. 9d. per lb.

*m*-NITRANILINE.—3s. per lb. d/d.

*p*-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8¼d. per lb. 100% basis d/d.

*o*-TOLUIDINE.—8d. per lb.

*p*-TOLUIDINE.—1s. 9d. per lb. naked at works.

*m*-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4½d. to 5½d. per lb.

LAMP BLACK.—£30 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 6d. to 2s. 8d. per lb.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 4d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 1d. to 2s. 3d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—8s. 9d. per lb.
BISMUTH CITRATE.—8s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 3d. per lb.
BISMUTH SUBNITRATE.—7s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.
BISMUTH OXIDE.—11s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 3d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7¾d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 19s. 9d. per lb. net; Synthetic, 12s. to 14s. per lb.; Synthetic detached crystals 12s. to 16s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—3s. 11d. to 4s. 2d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—100s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 5d. per lb. Crystal, 2s. 3d. to 2s. 6d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

## Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—14s. per lb.
COUMARIN.—9s. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—12s. 6d. per lb.
GERANIOL (PALMAROSA).—21s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. 6d. per lb.
ISO EUGENOL.—14s. 3d. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—56s. per lb.
SAFROL.—2s. 4d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—18s. per lb. Ex Guaiacol, 15s. 6d. per lb.

## Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—3s. 6d. per lb.
BERGAMOT OIL.—17s. 6d. per lb.
BOURBON GERANIUM OIL.—22s. per lb.
CANANGA OIL, JAVA.—11s. 6d. per lb.
CASSIA OIL, 80/85%.—6s. 3d. per lb.
CINNAMON OIL LEAF.—7s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 4d. per lb.
CLOVE OIL (90/92%).—9s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 16s. per lb.
LEMON OIL.—17s. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—20s. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—12s. 3d. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 14s. 3d. per lb.; Japanese, 7s. per lb.
PETITGRAIN.—8s. 9d. per lb.
SANDALWOOD.—Mysore, 31s. per lb.: 90/95%. 19s. per lb.

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, July 25, 1929.*

THERE is very little change to report this week. Prices generally remain steady. There is quite a fair volume of business passing. Export business has also been quite satisfactory.

### General Chemicals

ACETONE continues at £75 to £85 per ton, with a very steady demand.

ACETIC ACID.—Supplies are still very short, with the price firm at £36 10s. for 80% technical quality. The demand is very brisk.

ACID CITRIC continues in fair demand, with the price firm at 2s. 2d. per lb. to 2s. 3d. per lb.

ACID FORMIC is unchanged at £42 per ton for 85% in free carboys and in steady demand.

ACID LACTIC.—Firm at £43 per ton for 50% by weight, and in steady and improving demand.

ACID TARTARIC ACID.—Very firm at 1s. 4¾d. per lb., less 5%, and in much better demand.

ALUMINA SULPHATE.—Supplies are short for early delivery at £7 15s. to £8. per ton.

ARSENIC.—Unchanged at £16 5s. per ton, f.o.r. mines.

BARIUM CHLORIDE.—Very firm at £12 per ton, ex store, with practically nothing available for early delivery.

CREAM OF TARTAR.—The improved demand continues, with the price very firm at £98 to £100 per ton for 99-100% B.P. quality.

COPPER SULPHATE.—Steady at about £26 per ton.

FORMALDEHYDE is steady at about £38 per ton and in good demand.

LEAD ACETATE.—In better demand at £43 10s. for white and £42 10s. for brown.

LEAD NITRATE continues rather slow at about £33 15s. per ton.

LIME ACETATE is still very scarce and the price is firm at £18 per ton.

LITHOPONE.—Firm at £19 15s. to £22 per ton, according to quantity and quality.

METHYL ACETONE.—Firm at £58 to £60 per ton, and in steady demand.

CHLORATE OF POTASH is unchanged at about £28 to £30 per ton.

PERMANGANATE OF POTASH is very firm at 5½d. per lb., and in good demand.

POTASSIUM PRUSSIATE.—Unchanged and firm at £63 10s. to £65 10s. per ton.

SODA ACETATE CRYSTALS.—Firm at £22 10s. to £23 per ton. Supplies of crystals still short.

SODA BICHROMATE continues in good request at 3⅝d. per lb., with discounts for contracts.

SODA HYPO PHOTOGRAPHIC CRYSTALS.—In good demand and firm at £14 10s. to £15 per ton.

NITRITE OF SODA.—The improved demand continues, with the price firm at £20 per ton.

SODA PHOSPHATE is unchanged at about £12 per ton for dibasic and about £16 10s. per ton for tribasic quality, and in little better demand.

SODA PRUSSIATE is in brisk demand at 4¾d. to 5¼d. per lb. according to delivery.

TARTAR EMETIC.—Firm at 11d. per lb., and very much better demand.

ZINC SULPHATE.—Steady at about £12 per ton.

### Coal Tar Products

The prices of coal tar products remain firm, although there is very little business passing.

MOTOR BENZOL remains at 1s. 5½d. to 1s. 6d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is still quoted at about 1s. 2d. to 1s. 2½d. per gallon, f.o.r.

HEAVY NAPHTHA is unchanged at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL remains at 3¼d. to 4d. per gallon on rails in the north, and at 4¼d. to 4½d. per gallon in London.

CRESYLIC ACID remains at about 1s. 10d. per gallon for the 98/100% quality, and at about 1s. 7d. per gallon for the dark quality 95/97%.

NAPHTHALENES remain firm at about £4 10s. per ton for the fire-lighter quality, at £5 per ton. for the 74/76 quality, and at £6 to £6 5s. per ton for the 76/78 quality.

PITCH.—Makers are continuing to ask 40s. to 42s. 6d. per ton f.o.b. East Coast, but buyers are not pressing.

## Nitrogen Products

*Sulphate of Ammonia.*—The producers have now announced their prices for August-September at £9 9s. per ton, carriage paid in 6-ton lots to buyers' stations. Other terms as usual. So far, no business has been done at the new prices.

*Nitrate of Soda.*—Prices have not yet been announced.

## Latest Oil Prices

LONDON, July 24.—LINSEED OIL was steady but quiet. Spot, £37; August, £33 10s.; September-December, £33 5s.; and January-April, £33, naked. RAPE OIL was steady. Crude extracted, £41; technical refined, £43, naked, ex wharf. COTTON OIL was firm. Egyptian crude, £33 10s.; refined common edible, £38; and deodorised, £40, naked, ex mill. TURPENTINE was quiet. American, spot, 43s. 3d.; August-December, 42s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot, £34 17s. 6d.; July, £34 15s.; August, £34 10s.; September-December, £33 12s. 6d. per ton, naked. COTTON OIL.—Egyptian crude, spot, £33 5s.; July-August, £32 15s.; edible refined, spot, £36 10s.; technical, spot, £36 5s.; deodorised, spot, £38 10s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £36 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £36; deodorised, spot, £40 per ton. SOYA OIL.—Extracted, spot, and crushed, spot, £34; deodorised, spot, £37 10s. per ton. RAPE OIL.—Crushed-extracted, spot, £41; refined, spot, £43 per ton, net cash terms, ex mill. TURPENTINE, CASTOR OIL and COD OIL unaltered.

## South Wales By-Products

SOUTH Wales by-products continue to show slightly more activity with the exception of pitch, which has fallen back, buyers being apparently slow to buy at the existing prices of 39s. to 41s. per ton, f.o.b. Solvent naphtha has a fair demand round the 1s. 3d. to 1s. 6d. per gallon mark, while motor benzol is steady at from 1s. 4½d. to 1s. 7d. per gallon. Road tar has a slightly better demand, but values are unchanged at 10s. 6d. to 13s. per 40-gallon barrel. Crude tar has a steady, but moderate, call at 25s. to 30s. per ton. Refined tars continue to be a bright feature, both coke oven and gasworks tar having a good demand with values unchanged. Crude naphthalene remains weak, and a similar remark applies to whizzed. Patent fuel and coke exports are maintaining their slight improvement, but values are unchanged. Patent fuel quotations are:—Ex-ship Cardiff, 21s. to 21s. 6d.; ex-ship Swansea, 20s. to 20s. 6d. per ton. Coke prices are:—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 26s. 6d. to 32s.; furnace, 21s. to 23s. per ton. Oil imports over the last four ascertainable weeks amounted to 11,965,375 gallons.

## German Wood Distillation Industry

THE German wood distillation industry produced in 1913 about 18,000 tons of acetate of lime and processed another 20,000 tons imported almost exclusively from the United States. Comparable figures now are around 10,000 tons local production and 5,000 tons imported from Rumania and Czechoslovakia, the United States no longer figuring in this market. Official import figures of acetate of lime are the following:

| Year | Total Metric tons | Rumania Metric tons | Czechoslovakia Metric tons |
|---|---|---|---|
| 1925 ..... | 2,841 | 2,001 | 729 |
| 1926 ..... | 3,268 | 1,651 | 822 |
| 1927 ..... | 5,906 | 3,164 | 2,440 |
| 1928 ..... | 5,069 | 1,600 | 3,384 |

With German production of acetate of lime reduced, due chiefly to the high prices of wood for distillation, the sales possibilities of wood charcoal have also declined measurably as a result of the increasing use of gasoline soldering lamps, electric and gas flat irons. Declining sales of wood charcoal by Germany result in the reduction of sales of acetate of lime.

In the dry distillation of 100 kilos of acetate of lime, 30 kilos of acetone are theoretically produced, but in fact only about 25 kilos of ketones result, from which about 20 to 21 kilos pure acetone can be recovered. This lower yield may be explained by the fact that commercial acetate of lime possesses as impurities calcium salts of formic acid, propionic acid, butyric acid, etc., whose decomposition results in the formation of different ketones and other organic substances. Synthetic production of acetic acid and acetone from calcium carbide reduces the production of these products from acetate of lime, of which, as noted above, Germany consumed around 38,000 tons before the war.

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CAST STEEL
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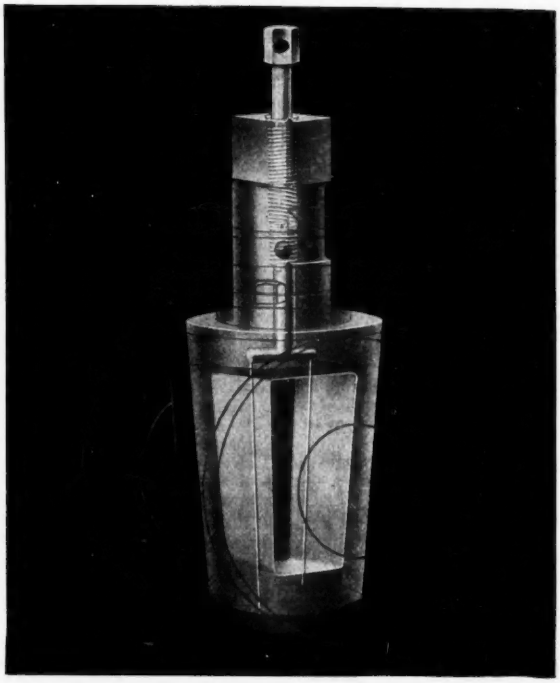

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# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

*Glasgow, July 24, 1929.*

NOTWITHSTANDING the fact of the holiday period locally not being completed there is a good amount of inquiry for heavy chemicals going around and the proportion of business in regard to inquiry has been good. The export section has also proved fairly satisfactory although a considerable amount of material has had to be exported from English ports.

### Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. Ports; 80% pure, £37 10s. per ton ex wharf; 80% technical, £37 10s. per ton ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags carriage paid U.K. stations. There are a few fairly cheap offers made from the continent.

ACID CARBOLIC ICE CRYSTALS.—In good demand and price increased to about 6¾d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Rather easier and now obtainable at round about 2s. 2d. per lb., less 5% ex store, prompt delivery. Offered at a fraction less for delivery ex wharf prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality, £5 15s. per ton for 158°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Now quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA, CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Some rather cheaper offers from overseas and bulk quantities can now be obtainable at round about £35 per ton, c.i.f. U.K. ports. Spot material unchanged at about £40 per ton, ex store.

ARSENIC, WHITE POWDERED.—Unchanged at £18 5s. per ton, ex wharf, prompt despatch from mines. Spot material quoted £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted £10 10s. per ton, c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4 ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex store.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Quoted £36 to £36 10s. per ton, according to quantity, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer at about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the Continent at £25 10s. per ton, c.i.f. U.K.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and 70/75%, £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM ACETATE.—65% crystal quality quoted about £19 15s. per ton, ex wharf; 63/78% anhydrous quality on offer at £20 per ton, carriage paid buyers' stations.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅝d. per lb., delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts,

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality £10 13s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, with usual extras for smaller quantities and refined qualities.

SODIUM PRUSSIATE.—Spot material on offer at 5½d. per lb., ex store. Quoted 5⅜d. per lb., ex wharf to go forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption:—Solid 60/62%, £9 per ton; broken, 60/63%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted at £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small quantities.

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### Low-Temperature Carbonisation of New Zealand Coals

IN a paper by Mr. W. G. Hughson, on the "Low-Temperature Carbonisation of Blended New Zealand Coals," published in the *N.Z. Journal of Science and Technology*, the author summarises his work as follows:—Low-Temperature carbonisation of a number of New Zealand brown coals gives an average yield per ton of 10.59 cwt. carbonised residue, 27.58 gallons of oils, 51.53 gallons of liquor, 3.30 lb. of ammonium sulphate, and 3,841 cubic ft. of gas. The average bituminous coal yield per ton is 14.23 cwt. of carbonised residue, 37.42 gallons of oils, 8.23 gallons of liquor, 1.24 lb. of ammonium sulphate, and 3,530 cubic ft. of gas. Low-temperature carbonisation of unblended New Zealand coals leaves either a non-coherent, non-coking residue, or a much-swollen mass of friable coke, according as the coal is brown or bituminous. Semi-cokes of a very satisfying text and hardness are obtained by carbonising suitable blends of brown and bituminous coals at 600° C."

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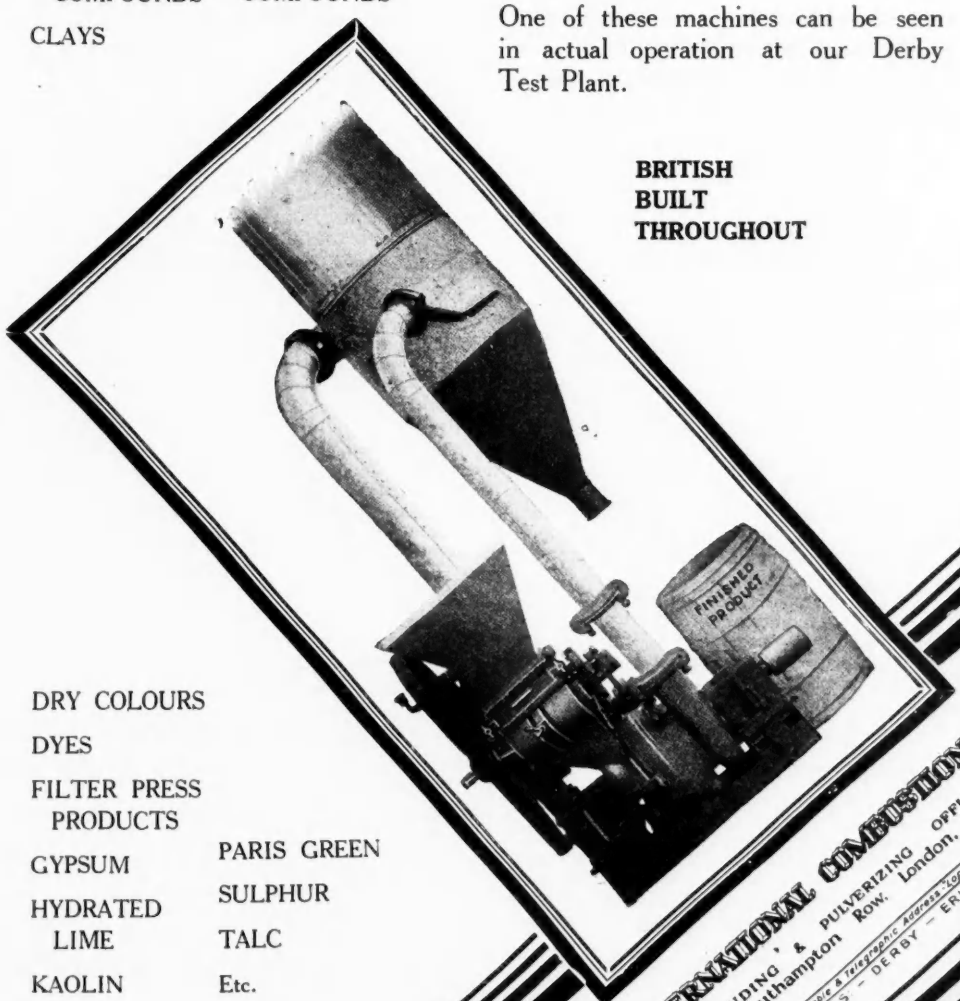


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# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, July 25, 1929.*

Holiday influences are having some effect on the total volume of business in chemical products on this market, but considering the period of the year and the unsettlement caused by the threatened stoppage in the Lancashire cotton trade, which, at the time of writing, shows no sign of being averted, the demand both against contracts and on the open market is not unsatisfactory. Only in a few sections of the market are values easy in tendency.

### Heavy Chemicals

The movement of saltcake is only of moderate extent, with quotations this week ranging from £2 10s. to £2 15s. per ton. Phosphate of soda is somewhat easier on balance at about £11 10s. per ton, and no great weight of business is passing in this section. There is a steady call for caustic soda, contract quotations for which are very firm at from £12 15s. to £14 per ton, according to quality. Alkali, also, is moving fairly freely on a contract basis of £6 per ton. Hyposulphite of soda meets with a moderate volume of inquiry and prices are reasonably steady at about £8 15s. per ton for the commercial material and £15 10s. per ton for the photographic. Buying interest in bichromate of soda has been fairly active and quotations for this material are fully maintained at 3⅜d. per lb. Prussiate of soda is being steadily inquired for and values in this section are well held at from 4¾d. to 5¼d. per lb., according to quantity. Sulphide of sodium this week has been in relatively poor request, but there has been little alteration in price levels; the 60-65 per cent. concentrated solid quality is on offer at round £9 per ton and the commercial grade at from £7 10s. to £8. Bicarbonate of soda continues to move off in fair quantities and prices are firm on the basis of £10 10s. per ton. Chlorate of soda meets with only a comparatively quiet demand, but quotations, although on the easy side, show little change at from 2½d. to 2¾d. per lb.

Among the potash products, carbonate is now being quoted at about £25 10s. per ton for the 96 per cent. solid material, and a moderate volume of business has been reported during the week. With regard to caustic potash, this keeps fairly steady at the lower rate of from £32 10s. per ton, according to quantity. A steady trade is being done in the case of bichromate of potash, offers of which are well held on the basis of 4⅜d. per lb. Yellow prussiate of potash meets with a fair volume of inquiry and the tone remains firm; quotations vary from 6¾d. to 7¼d. per lb., according to quantity. Chlorate of potash is on the quiet side, but at 2¾d. to 3d. per lb. values show little change on the week. A moderate trade is being put through in permanganate of potash and offers of this material are maintained at about 5½d. per lb. for the B.P. grade, and from 5⅛d. to 5¼d. per lb. for the commercial.

Arsenic is steady at from £16 to £16 10s. per ton at the mines for white powdered, Cornish makes, though sales in this section are still somewhat restricted. Buying interest in the case of sulphate of copper is of moderate extent but prices are still in the neighbourhood of £27 10s. per ton, f.o.b. The acetates of lime are in quiet demand, with the grey quality obtainable at about £16 10s. per ton, and the brown material at £8 5s. Nitrate of lead is slow and easy at round £34 per ton, with the acetates of lead about unchanged on the week at £40 per ton for the white and £39 to £39 10s. for the brown.

### Acids and Tar Products

Citric acid is selling in moderate quantities, with bulk supplies still quoted at about 2s. 1d. per lb. Tartaric acid meets with a fair amount of inquiry at from 1s. 4¼d. per lb. Oxalic acid is steady although the demand during the past week has been rather slow; to-day's offers are at about £1 12s. 6d. per cwt., ex store. Acetic acid keeps very firm and a steady trade is being done at round £67 per ton for the glacial, and £36 for the 80 per cent. commercial.

There has been a moderate volume of forward buying in the pitch section of the by-products market at up to £2 2s. 6d. per ton, f.o.b., with creosote oil still relatively inactive at about 2¾d. per gallon, naked, at works. Carbolic acid crystals are firm and in good demand at 7d. per lb., f.o.b., as is also crude 60's at round 2s. 2d. per gallon. Solvent naphtha is steady and in moderate request at from 1s. 2d. to 1s. 3d. per gallon.

# Company News

Anton Jurgen's Vereenigde Fabrieken.—The dividends on the various classes of preference shares for the half-year to June 30 last have been declared.

English China Clays.—An interim dividend is announced on the cumulative preference shares at the rate of 7 per cent. per annum for the half-year ended June 30, to be paid on August 1.

British Celanese Co.—The net profits for the year ended February 28 were £326,909, and £429,363 was brought forward. Dividends on the first and second preference shares to April 30 last have been paid, £23,754 was written off for commutation of royalties, placing £23,754 to depreciation, £200,000 to reserve, and £137,387 is carried forward.

Gas Light and Coke Co.—The directors have declared the dividends for the half-year ending June 30 last on the 4 per cent. consolidated preference stock at the rate of £4 per cent. per annum; on the 3½ per cent. maximum stock at the rate of £3 10s. per cent. per annum; and on the ordinary stock at the rate of £5 12s. per cent. per annum. Last year the interim distribution on the ordinary stock was at the rate of £5 10s. per cent. per annum.

National Smelting Co.—The net profit for 1928 disclosed in the report for that year just issued, amounts to £184,212—an improvement of £8,120. The profit figure is arrived at after payment of debenture interest and provision for depreciation and income-tax. It includes dividends and interest on investments. With £59,674 brought in, there is available £243,886, which compares with £224,674 in 1927. The ordinary dividend for the year is repeated at 10 per cent., and the participating preference shares receive another 2 per cent., making 10 per cent., as before, but still no payment is made on the deferred shares, on which no dividend has yet been paid. The balance to be carried forward is £78,886.

Lovering China Clays.—The statutory report states that the total number of shares allotted is 400,000 of £1 each, upon 380,000 of which £1 per share has been paid in cash. Remaining 20,000 shares have been allotted as fully paid to vendors. The total amount of cash received by the company in respect of 380,000 shares allotted wholly for cash is £380,000. The following is an abstract of the receipts on capital account and payments made up to July 16, 1929: Receipts: Share capital account—Amount received for 380,000 shares allotted for cash, £380,000. Debenture account—Amount received in respect of 2,500 debentures of £100 each issued at £96, applied for and allotted £239,908. Payments: Purchase consideration paid to vendors, plus incidental expenses, etc., £607,150; preliminary and formation expenses, including stamp duties, fees and law charges, £15,427; commission to brokers on applications for shares and debentures and commission to underwriters of debenture issues, £7,002; less amount provided from sources other than issues of share and debenture capital, £9,671. The preliminary expenses are estimated at £24,000.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

Sodium Acetate (Commercial).—The Victorian Railway Commissioners at Melbourne, Australia, are calling for tenders, to be presented in Melbourne by October 2, 1929, for the supply of 25 tons of sodium acetate (commercial). (Contract No. 42,729.) (Reference B.X. 5,484.)

Water Softening Plant.—The South African Railways and Harbours are calling for tenders, to be presented in Johannesburg, South Africa, by August 15, 1929, for the supply of water softening plants. (Tender No. 1,459.) (Reference A.X. 8,231.)

Boiler Feed Pumping and Filtering Plant.—The Egyptian Ministry of Public Works is calling for tenders, to be presented in Cairo by August 7, 1929, for the supply, delivery and erection of boiler feed water pumping and filtering plant. (Reference A.X. 8,246.)

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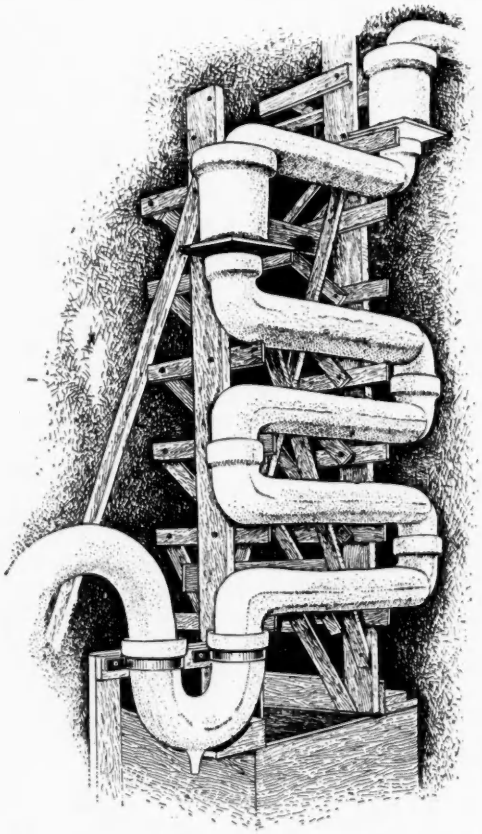

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## Action Against Former Employee

### Judgment by Consent

In the King's Bench Division, on Monday, before Mr. Justice Horridge, a settlement was announced in the action of Parke Davis, Ltd. *v.* Bowden. By consent the defendant agreed to a judgment against him for £2,000 and costs.

Mr. Croom Johnson, K.C., for the plaintiffs, explained that for many years defendant was in charge of the plaintiffs' buying department. Last year it was discovered that between 1922 and 1925 he had been sending orders on behalf of the plaintiffs to a firm in which he had an interest. When this and other facts came to the knowledge of the plaintiffs, they terminated the employment and brought their action, claiming £2,000 as the money the defendant had received out of orders given to a firm in which he had an interest without disclosing the facts to his principals. Had the action proceeded plaintiffs in all probability would have been in a position to prove that they had been injured by the transactions. Now that the action had come before the court, defendant had consented to judgment being returned for the plaintiffs for £2,000 and costs, subject to certain arrangements made as to the manner in which the judgment was to be liquidated. The £200 in court would be paid out to plaintiffs' solicitors in part satisfaction of the judgment. It was perhaps desirable that it should be stated that persons in the position of the defendant could not be allowed to make profits out of transactions made on behalf of his principals without disclosing to them that he was making dual profits.

Mr. Raynor Goddard, K.C., for the defendant, said that Mr. Bowden had accepted advice tendered to him and recognised that he had been treated generously by his former employers. Defendant desired to express his regret for having committed what was a breach of his duty towards them.

His Lordship entered judgment accordingly with a stay of execution upon the terms agreed.

### Canadian Ammonium Sulphate Exports to the East

Canada is shipping substantial quantities of sulphate of ammonia to the Orient. In 1928, shipments to Japan, China, and Hong Kong amounted to 8,395 long tons, valued at $365,284, as compared with 11,771 tons, valued at $515,859, in 1927. Exports of ammonium sulphate to all countries during 1926, 1927, and 1928 were 16,383, 16,997, and 13,632 tons, respectively. The following amounts were shipped to the Orient :—

| | 1926. Tons. | 1927. Tons. | 1928. Tons. |
|---|---|---|---|
| China ..... | 3,185 | 1,283 | 1,694 |
| Hong Kong..... | 159 | 2,980 | 3,451 |
| Japan..... | 8,202 | 7,498 | 3,298 |

A large steel company located in Ontario is reported to be the chief source for sulphate of ammonia shipped to the Orient. For a considerable time shipments were made through Atlantic ports, until favourable freight rates allowed shipments to be made via Pacific coast ports. Since British Columbian mining companies are likely to become substantial producers of ammonium sulphate in the near future, it is expected that shipments of this fertiliser to the Orient through the port of Vancouver will increase.

### Amber Deposits in Manitoba

The *Financial Post* (Toronto) of May 6 contains an article setting forth some of the facts in regard to the submerged forest which is believed to exist under Cedar Lake, an extension of the Saskatchewan River, near to the point at which it enters Lake Winnipeg. From time immemorial Indians have gathered amber along the shore of Cedar Lake. Some of the pieces found are as large as robins' eggs, and they are from pale yellow to dark brown in colour. In one area, 10 per cent. of the material of the beach is stated to be made up of amber, reports having been made there between 50 and 60 years ago. At that time, the exploitation of the amber deposits derived from this submerged forest was considered to be impossible in view of the difficulty of transporting machinery to the spot. With the construction of the Hudson Bay Railway and of other methods of communication into this neighbourhood, it is believed that exploitation of these resources may be practicable, though the difficulty of mining in water presents a problem which has not yet been completely solved.

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

GOLDSTRAW, Edna May, Mrs., (trading as F. J. WILLIAMS), 49, George Street, Newcastle, drug dealer. (C.C., 27/7/29.) £13 14s. 8d. June 4.

WALTON, A. AND CO., Bridge Mills, Tarvin Road, Chester, soap and chemical manufacturers. (C.C., 27/7/29.) £11 9s. 5d. June 21.

## London Gazette, &c.

### Companies Winding Up Voluntarily

GALEN MANUFACTURING CO., LTD. (C.W.U.V., 27/7/29.) By Special Resolution, June 28, confirmed July 15. J. W. Brabner, Chartered Accountant, 32, Queen Victoria Street, E.C.4, appointed as liquidator.

## Receivership

ZINC OXIDES, LTD. (R., 27/7/29.) W. Boniface, of 10, Serjeant's Inn, E.C.4, was appointed Receiver and Manager on July 10, 1929, under powers contained in debentures dated April 23, 1927, and January 16, and July 19, 1928.

## New Companies Registered

THE CARBONISING HOLDINGS CO., LTD., 428, Salisbury House, London Wall, London, E.C.2. Registered as a "public" company on July 13. Nominal capital of £200,000 in 80,000 "A" shares of £1 each and 1,200,000 "B" shares of 2s. each. To adopt an agreement with the Société Hatfi Société Anonyme, to carry on the business of distillers, extractors, producers, manufacturers and suppliers of all solid, liquid and gaseous substances or matter derived from coal, cannel, coke, semi-coke, shale, lignite, and other carbonaceous materials or from derivatives obtained therefrom, metallurgists, manufacturers of chemicals and manures, oil refiners, and dye and gas makers, etc.

KENTMERE DIATOMITE COMPANY, LTD., 3-4, Clement's Inn, Strand, London, W.C.2 Private co. Registered July 12. Nominal capital, £500 in 2s. shares. To carry on the business of manufacturers, importers and exporters of and dealers in all kinds of metallurgical, calcareous, carbonaceous and silicious compounds, chemicals and pharmaceutical and technical materials; to acquire from Porosity, Ltd., certain freehold property forming part of the Millriggs Estate at Kentmere, Westmorland, and the residue of a term of 21 years from November 16, 1928, in certain leasehold hereditaments forming part of Kentmere Hall Farm at Kentmere, and to undertake liabilities in respect of the said freehold and leasehold property, etc. So long as the Leeds Fireclay Co., Ltd., hold £300 shares, they may nominate three directors; and so long as Porosity, Ltd., hold £200 shares, they may nominate two directors.

PURSO, LTD, 37, Moorfields, Liverpool.—Registered July 23. Nominal capital, £600 in £1 shares. Soap and varnish makers, manufacturers of and dealers in soap, candles, tallow, oil, glycerine, chemicals, paint, dyes, colours, varnish, dynamite and other explosives, etc. Directors: G. F. Ward, T. S. Ward, W. J. Grace, T. H. Hughes, A. W. Orme.

WARDLE CHEMICAL CO., LTD., Lawflat Works, Wardle, near Rochdale.—Registered July 20. Nominal capital, £500 in £1 shares. Chemical manufacturer and merchant, heretofore carried on by S. Jackson, at Lawflat Works, Wardle, near Rochdale. Directors: S. Jackson and F. Cocks.